

STATE OF NEVADA  
THIRTEENTH BIENNIAL REPORT  
OF THE  
DEPARTMENT  
OF HIGHWAYS

For the Period  
July 1, 1940, to June 30, 1942, Inclusive

ROBERT A. ALLEN  
State Highway Engineer



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1940-42

CARSON CITY, NEVADA  
JOE FARNSWORTH, SUPERINTENDENT  
1942



STATE OF NEVADA

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STATE PRINTING OFFICE - - - JOE FARNSWORTH, SUPERINTENDENT  
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THIS report is dedicated to those very fine young men who have left this Department to go into the service of our Country, and with the sincere hope that they will all return to resume their duties with the Department as soon as the world is safe for decent-living people.



## LETTER OF TRANSMITTAL

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HONORABLE E. P. CARVILLE, *Governor of the State of Nevada,  
Carson City, Nevada.*

DEAR GOVERNOR CARVILLE: The Department of Highways presents its Thirteenth Biennial Report for the period from July 1, 1940, to June 30, 1942.

This report covers the activities of the Highway Department during the biennium and also indicates the construction program for the ensuing fiscal year.

Your attention is called to the fact that the fine cooperation of the United States Public Roads Administration, County Commissioners, and the citizens of Nevada continued throughout the biennium to the mutual benefit of the citizens of the State and to the traveling public. With whole-hearted cooperation, the employees of the Department materially advanced the work in their respective fields.

We desire to express our appreciation of the valuable assistance and encouragement given by yourself and the Board of Directors in conducting the business of this Department.

DEPARTMENT OF HIGHWAYS,

ROBERT A. ALLEN,  
*State Highway Engineer.*



## THIRTEENTH BIENNIAL REPORT OF THE DEPARTMENT OF HIGHWAYS

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Since the report of any State department for a biennial period should be a continuing story and becomes another chapter in the progress of the department, we shall construe this biennial as just "Chapter 13" in the story of Nevada highways started in 1917.

Extensions to the highway system were built and reconstruction work was performed within the limits of Federal moneys allocated to this State. Maintenance work in keeping the road system to high standard was carried on with State funds made available through taxation on road users.

The planned program for the operations of the department was followed somewhat in detail, our work being curtailed only because of the ruling of the Attorney-General that certain functions of the planned operations of the department were not in accordance with a constitutional amendment freezing the funds of the department. The publication of "Highways and Parks" which proved so popular through the last several years was abandoned. The Safety Division work was very much curtailed and abandoned in part. The Landscape Department, authorized and supported by Federal appropriations was curtailed to come within the provisions of the antidiversion Act. The 1941 Legislature corrected these features and set forth what, in its estimation, were the functions of the department.

The State Legislature was invited by the State Highway Engineer to investigate any of the reports and records of the Highway Department. On February 17, 1941, a fact-finding committee of the joint highway committees of the Legislature was appointed and given the duty of making a survey of the policy and administration of the State Highway Department. It had two main purposes—so the report reads:

(1) To study the effect on the Highway Department of the adoption of the constitutional amendment, prohibiting the use of motor vehicle tax moneys for purposes other than the actual construction and maintenance of highways.

(2) To hear any public complaints against the Highway Department.

The committee was fathered by Baker and Tallman. On about March 14, the committee's report was submitted to the Legislature with two rather significant statements:

The limited time available for the conducting of the fact-finding investigation of the Highway Department has made it necessary for your committees to limit themselves in reporting findings to a few pertinent facts regarding the Highway Department \* \* \*

and

We further recommend that a joint resolution should be passed by both the Senate and the Assembly which would continue the activities of the subcommittee of the Public Highway Committees of both Houses, during the next two years, without cost to the State, in order that a more thorough

fact-finding investigation may be made of all matters pertaining to highway work in the State of Nevada, and a report of such findings reported to the next session of the Legislature.

and on March 17, 1941, by an appropriate resolution, the work of the investigating committee was directed to be continued during the interim between the fortieth and forty-first sessions. We quote at length on this matter to show the necessity of an appropriation to employ a group of experts who are familiar with highway work and the operations of a highway department if such an investigation is to be carried on as initiated by Baker and Tallman.

Your department's officials again ask for and welcome the closest scrutiny of their actions. As is well known, the accounts of the department are audited at least monthly by Federal auditors from the Public Roads Administration and the State accounts are audited by the State Auditor. These records, together with all records, are always available for the perusal and study of the citizens of the State. We again reiterate that since the Highway Department and its operations are one of the State's biggest businesses, it behooves each and every citizen of the State to check and recheck its operations in order that he or she might be satisfied that it is being run in the efficient way which they demand.

The 1941 Legislature added to the duties of the department when it passed the Drivers License Division Act, and made the State Highway Engineer administrator, giving to the Highway Department another phase of the safety of the traveling public using the highway system. We have designed and have built our road system primarily from the safety viewpoint, yet the roads can be driven by people with all degrees of mentality. Since it is a well-known fact that we all resent any encroachment on our freedom to drive our automobiles as we please just as we, as American citizens, resent any show of restriction on our freedom to vote or attend whatever church we may elect, the operations of this division have not been popular with many of the drivers in the State. The Drivers License Division seeks only to eliminate those people from driving on our roads who, by their very acts or physical deficiencies, prove that it is unsafe for them to drive. We have been entirely sympathetic with our driving public and have sought only to educate it to make travel safer for the large majority through the improvement and control of the driving habits of our people who use our highways.

The War effort has also added many duties to the Highway Department and the various members of the staff. Cooperation has been extended in every way possible to the War and Navy Departments and various other Federal and State departments to help along this effort.

Our improved highway system now covers in excess of 3,200 miles. It represents an investment of \$63,000,000, and we are happy to say that we have no outstanding indebtedness against this system, having paid off (out of highway revenues) the last of the bonds over a year ago.

Our maintenance buildings and shops throughout the State have

been placed on a more permanent basis and built to adequately house our maintenance forces and equipment.

In the biennium just passed, we have had brought forcibly to mind the necessity for an adequate highway patrol to take care of the enforcement of the drivers license and other laws, rules and regulations which are peculiar to the operations of and on the highway system.

Extensions of the highway system should be studied carefully and not made for convenience only, inasmuch as the maintenance of these extensions, as with all parts of the road system, is a State obligation without Federal help. The return from travel on our road system, usable for maintenance of the system, is only one dollar per year, per vehicle, per day, per mile of road. If maintenance cost per year per mile of road is \$200, then the travel to meet the *maintenance cost alone* must be made by 200 cars per day.

The department has initiated and is carrying on, with the aid of the Federal Government, studies in advance engineering for future improvements to the highway system. These studies cover anticipated changes in the highway system which will be necessary in the next ten to fifteen years because of increases in population, changes in type of industry, and expansions in the cities of our State.

We respectfully refer you to the recommendations and to separate sections of this report for details of each division of the Department.

### RECOMMENDATIONS

We recommend the adoption of a Highway Safety Division, supported as other State activities are supported, since the safety of so many people who are traveling on the highways is as much a public responsibility as the conservation of wild life, pest control, and the eradication of communicable diseases. Such a division could, in our opinion, very properly be handled by the Highway Department.

It is the recommendation of this department that you consider legislation providing for an adequate highway patrol charged with the duty of policing the highways and enforcing the drivers license laws.

It is recommended that suitable resolutions be adopted by the Legislature calling upon the Congress to maintain Federal aid methods of road building for both the primary and secondary (farm-to-market or mine-to-market) systems, using the present supervisory agencies such as the Public Roads Administration and the respective State Highway Departments, whose work has proved so efficient in the past.

It is recommended that the highway revenues be not impaired by amendments or change in gas tax, plate license tax, common carrier tax or, any other highway revenue during the period of the emergency. If this fund is impaired, we will not then be able to meet the cooperative requirements of the Federal Government which would make Federal funds available for construction and reconstruction after the War, and at the same time permit the maintenance of our highway system which we are under contract with the Federal Government to maintain to a standard fixed by the Public Roads Administration.

It is the recommendation of this department that the present "safe and sane driving" speed limit be retained in our law, but that the Act

be amended to give to the Highway Engineer the right to zone certain sections of the highway for speed in conformity with the construction features and the needs for a reduced speed because of weather conditions and the above-mentioned construction features.

### HIGHWAY CONSTRUCTION

During the first part of the closing biennium, new construction and reconstruction of State highways progressed in the methodical manner as in the previous period. Congress had made the regular and customary sized appropriation. Plans, surveys, and estimates had been well formulated to use all of the approximately four million dollars allocated for the two-year period. The major portion, as usual, had been earmarked for reconstruction along the main traveled routes of the Federal aid system, principally along U. S. Routes 40 and 91; some \$640,000 had been allocated for construction of feeder roads, railroad crossing structures, and so-called Federal Land highways.

Between July 9, 1940, and November 14, 1941, twenty-nine contracts were let covering 221 miles. These 221 miles included 127 miles of reconstruction of main highways on the Federal aid system, 44 miles of new feeder roads (farm-to-market and mine-to-market), and 50 miles of Federal Land highways.

War had started in Europe on September 1, 1939. Then followed December 7, 1941, and Pearl Harbor.

The interim had not been one of entire oblivion, or "highways as usual." Not long after September 1, 1939, the Public Roads Administration collaborating with the War Department, designated a strategic network over the existing interstate and interregional system. With troop and supply movements to originate from an Army Corps headquarters such as at Salt Lake City, U S 40 leading to San Francisco and U S 91 to Los Angeles, naturally resulted in these highways being designated of primary importance. U S 50 and U S 6 as alternate routes also became a part of the strategic network.

Military movements with caravans of heavy and fast-moving equipment require certain minimum widths of roadway surface, shoulders, bridge loadings, etc.

Nevada's plans and specifications have always met these requirements with only one slight exception—on the strategic network the Army requires shoulder widening to permit parking, eight feet in width measured from the edge of the surfacing, each parking section to be 2,000 feet long, and constructed at 2 mile intervals. This was only a slight modification as practically all reconstruction projects were being designed with continuous eight-foot shoulders.

Between November 14, 1941, and April 9, 1942, no highway contracts were awarded. It is not to be inferred as having been a period of inactivity. On the contrary survey crews and office forces were working extra hours and Sundays to complete surveys and plans to meet governmental demand for early construction of access roads—highways to reach deposits of strategic minerals and to plants where raw materials are to be milled into war materials. Contracts were let for constructing 33 miles from Luning to Gabbs Valley for access to the magnesite deposit, the source of material to be calcined first and

then shipped to the refining plant in Clark County. Another contract provided for reconstruction of the existing two-lane road with an additional dual lane from this defense industry plant 12 miles into Las Vegas.

While both of these projects were designed to main-line highway standards, construction cost only amounts to approximately 1 percent of the cost of the defense plant of which they must be considered an integral part.

In addition to the above-described access roads only one other section of highway was placed under construction during the period between December 7, 1941, and the end of the biennium June 30, 1942—from Battle Mountain to 21 miles westwardly. As previously noted, this section is on the strategic network and main highway between Salt Lake and San Francisco, and as such would be eligible for consideration. Construction must be deemed essential to the War effort. Projects selected must be of such importance that postponement would be detrimental to essential motor transport. Projects must be located in areas where sufficient labor and equipment would be available, and designed to require a minimum of materials which are most critical.

All of these requirements were easy to fulfill. As an example, in lieu of metal pipe and steel reinforced concrete culverts used on the ordinary highway job, plain concrete pipe was substituted.

It is of interest to note that on a 21-mile highway job only \$145 of critical materials were needed, involving nails and tie-wire for forms to construct concrete headwalls.

Rules and regulations as outlined in the foregoing undoubtedly will continue to govern the construction activities of the State highways for the duration.

### PLANNING SURVEY

During 1936 in cooperation with the Public Roads Administration, the Nevada Statewide Highway Planning Survey was established. The Public Roads Administration had, for several years, seen the necessity of a fact-finding planning organization and finally secured approval of Federal participation in the cost of necessary studies, such Federal participation limited to one and one-half percent of the Federal funds allocated for highway construction within the several States and to be matched by State funds in the same ratio that construction funds are matched. The three major phases of the survey as set up by the Public Roads Administration and the Department of Highways are:

1. Inventory—Involving a field inventory, or survey, of all roads and culture as well as the preparation of county and State maps based on such inventory.

2. Traffic—Consisting of the procuring and operation of mechanical traffic recorders and the analysis of the data gathered in the field.

3. Financial—Including the study of receipts and disbursements, the preparation of tables showing road mileage, construction costs, etc., and a study of motor vehicle habits and road usage.

The close of the present biennial period marks the sixth year since the Planning Division became a functioning member of the State Highway Department. Since its inception the division has completed road traffic and culture surveys of the entire State, kept records of traffic

on all important roads, carried on financial studies pertaining to highway economies, and made special investigations on a variety of projects as the need arose.

From the data gathered the Planning Division has formulated basic principles for future highway planning and development, and assures each community of impartial consideration of road needs on a factual and scientific basis.

The gathering of the material has now reached the stage where an over-all picture of future highway needs is obtainable and State-wide planning is possible, assuring equitable utilization of public funds in highway improvement.

There follows a brief summary of each of the activities engaged in by this division.

#### INVENTORY

The original field inventory program which began in 1936, having been completed and the maps and statistical data compiled from the information gathered, a continuing program designed to secure a periodic revision of the data originally gathered was inaugurated in the spring of 1941.

In accordance with the plan formulated when the planning program was first initiated, a schedule calling for a reinventory of all of the roads in approximately one-fifth of the State per year was outlined. Under this plan a group of counties which included Ormsby, Storey, and Washoe was selected and the reinventory commenced. A new method of road logging utilizing a gyroscopic compass for the securing of accurate bearings, and odometer reading to  $\frac{1}{100}$  of a mile for better distances, and the use of a dictaphone for the recording of the field record, reduced the original three-man inventory party to a single operator and resulted in more detailed and accurate mapping of roads. A good deal of attention was paid to the securing of ties to triangulation stations, mostly established by governmental agencies, but in some instances by the Planning Division itself, for the purpose of securing better map control for the roads. A tie was also secured from every net of iron pipe section corners in the county to a triangulation station, thus providing mapping control for the reliable land grid surveys and a basis for the distribution of errors and discrepancies in the older surveys.

The information gathered in the reinventory program was substantially the same as that gathered in the 1936 survey, and included type, width, and condition of roads, a record of all important structures, grade crossings, the securing of clear-sight distance data on grade crossing, the location and classification of farms, businesses, etc., along each road, and the location of principal drainage, bench marks, and triangulation stations. Considerable time was also spent in securing the definite location of the county lines so that they could be accurately portrayed on the maps with respect to land grid and also in order that statistical data by counties would be more correctly defined.

As part of the inventory program, personnel from the Planning Division extended geodetic control and identified points on aerial photographs so that accurate maps could be prepared from the pictures. The actual mapping work from the pictures was carried on by various governmental agencies, including the Division of Grazing

and the Agricultural Adjustment Administration, the furnishing of control being a cooperative effort on the part of the Highway Department. The use of these maps when completed simplified reinventory operations in that no distances or bearings had to be taken along the separate courses, the maps furnishing detailed and accurate road traverse, the only measurements necessary being those covering total length of road sections and identifying inventoried items. This resulted in a speeding up of operations and a considerable reduction in inventory cost.

As of June 30, 1942, three counties, Ormsby, Storey, and Washoe, had been completely reinventoried, a total of approximately 1,900 miles of road having been covered. When compiled, the data gathered during this inventory will furnish a basis for county map sheets which undoubtedly will have a high degree of accuracy as regards roads, political subdivisions and land grid, and a detailed summary of road information, thus furnishing a better basis for future highway planning and development.

#### MAPPING

At the beginning of the present biennium, approval from the Public Roads Administration had been secured on all of the county map sheets with the exception of Nye County which was secured late in 1940. This completed the maps of the seventeen counties, represented by forty-eight sheets at the scale of one-half inch equals one mile. Subsequent to completion, reduced copies of each county sheet were procured at the scale of one-fourth inch equals one mile, and both sizes were made available to the public at the cost of printing. The immediate and wide-spread requests for prints of these maps by individual, civil, and military personnel indicated their definite need and justified the department's subsequent policy of revising the county map series by more detailed and accurate methods than originally contemplated when the planning survey program was set up. These later methods, which involved the use of accurate ties to points of known geographic position, more accurate logging of unsurveyed roads, gathering of additional detail for natural and artificial culture were outlined by the Planning Division in the preceding biennial report.

To further complete the mapping program, State maps at the scale of eight miles to the inch and ten miles to the inch were prepared from a base map compiled from the individual county sheets. These State maps showed the Federal and State Highway Systems, main rural country roads, the various political subdivisions, boundaries of Federal forests, reservations, etc., and the land grid represented by township lines only. These maps were also made available for public consumption at the cost of printing. The same base also served to prepare the 1941 and 1942 State highway road maps, tracings for which were prepared by the Planning Division.

During the latter part of the biennium twenty-seven map sheets were prepared showing the roads, culture, and traffic in sixty-two congested areas in unincorporated towns or in areas outside of the incorporated limits of the larger cities. These covered the following towns:

Austin	Beatty	Bunkerville
Alamo	Beowawe	Caliente
Battle Mountain	Boulder City	Cobre

Contact	Luning	Preston
Dayton	Manhattan	Reno
Deeth	Mason	Riepetown
East Ely	McDermitt	Rio Tinto
Eureka	McGill	Round Mountain
Fallon	Mesquite	Ruth
Fernley	Midas	Schurz
Gerlach	Mill City	Searchlight
Golconda	Mina	Silver City
Goldfield	Montello	Silver Peak
Goodsprings	Mountain City	Stewart
Hawthorne	Nixon	Stillwater
Hazen	North Las Vegas	Tonopah
Imlay	Overton	Verdi
Jarbridge	Panaca	Virginia City
Kimberly	Paradise Valley	Wabuska
Lamoille	Pioche	Wadsworth
Lund		Yerington

Copies of these maps were also made obtainable at the cost of printing.

In the fall of 1941 work was commenced on revision of the five map sheets representing the area covered by Ormsby, Storey, and Washoe Counties. The new map sheets are at the scale of one-half inch equals one mile, greater care being taken in laying out the map projection and the geodetic control on the hard copies. The hard copies were reduced to forty minute quadrangle size and a more durable material, mounted on a heavy cardboard base, was used, facilitating the handling and preventing damage and changes in base due to temperature and atmospheric fluctuations. All highway, railroad, power line, telephone line, and other reliable traverses were controlled geodetically and used for accurate spotting of roads and section corners. A portion of the area in Ormsby and southern Washoe Counties is covered by maps prepared from aerial photographs, and all information as to roads and land grid contained thereon will be utilized. At the close of the biennium the preliminary lay-out and computation for the three counties had been completed and actual construction of the new maps was under way. The new maps should be far superior to the original, and will fill a long-felt need for such accurate information.

#### SPECIAL STUDIES

The biennium just passed has seen a number of requests for special information on roads, traffic, maps, etc., placed before the Planning Division, many of them emanating from military authorities. Familiarity with conditions throughout the State, and possession of data gathered during the last six years, made it possible to give immediate and detailed replies to nearly all requests.

#### PARKING AREAS FOR MILITARY CONVOYS

In September 1941, at the request of the Army, the Planning Division made a survey along U. S. Route No. 395 for the purpose of determining the portions of that route which were available for parking military convoys on the shoulders. A field inventory was conducted,

determining by mileage from readily identifiable points the beginning and end of each section which would serve the desired purpose, and diagrams showing these areas, their lengths and sufficient adjacent culture so that they could be readily recognized, were prepared.

#### FLIGHT STRIPS

Early in 1942 at the request of the military authorities and under authority granted in section 8 of the Defense Highway Act of 1941, the Planning Division of the State Highway Department investigated 24 sites for proposed flight strips which would serve as emergency landing fields for aircraft. In these studies a preliminary investigation was made in the field in which wind direction, grade, material, flying conditions, etc., were examined, a tentative site was selected, and a rough survey made for the purpose of estimating quantities and cost. The approximate quantities were determined in the office and a preliminary estimate prepared for each location, these data being forwarded to the proper authorities for examination and selection of sites. By the end of this biennial period assurance has been given of the probable construction of at least two of these flight strips financed entirely with Federal funds at an estimated cost exceeding one half million dollars.

#### RENO AND SPARKS ORIGIN-DESTINATION STUDY IN RENO-SPARKS AREA

In May and June of 1940, studies were made at four main stations on the principal routes leading into the Reno-Sparks area to provide information for the purpose of alleviating traffic congestion within the area. Field parties stopped and interviewed a total of 4,762 drivers, securing data on origin, destination, and character of the car trip, the route traveled, expenditures for auto travel, subsistence, and recreation, and total time spent within the area.

During the last two years compilation of the data gathered has been under way and as a result it has been found necessary to make additional studies at other points within the area. The purpose of these studies has been to find a number of routes which can be constructed near the limits of the congested areas and which will serve to divert that portion of the traffic having no reason for travel within the congested area except that at present no other through routes are available. In this connection special counts were made at the principal railroad crossings in Reno and 17th Street in Sparks, gathering data on hourly and daily traffic. A check was also made on the number of train movements and the time during which the crossing was blocked to traffic. Special traffic counts were also made at the principal street intersections in Reno.

The information gathered has not been fully compiled and analyzed, but when this is completed should furnish a guide for comprehensive planning of routes in and around the Reno-Sparks area.

#### SPEED STUDIES

With the increased use of large trucks as a medium of transportation, the necessity of providing relief for traffic delay on steep grades caused by these slow-moving vehicles has become apparent to almost

every motorist. In an effort to provide some concrete data as to actual time loss to traffic and to weigh this against costs of alleviating the problem, a study was conducted on the Lakeview and Washoe Summits on U. S. Route 395 during June 1940. Both of these summits are approached by six percent grades, and several curves of limited sight distance are double-striped to prevent passing. Traffic over this road averages about 1,500 cars per day throughout the year, with a considerable portion of this confined to peak daylight hours.

A two-man checking party stationed at various points of restricted passing counted all cars passing and timed as many as possible over a measured course, giving preference to those traveling upgrade. During the checking period a total of 4,529 cars were counted and speed checks obtained on 3,142 or 69.4 percent of these.

The following summary shows the data obtained:

93.78% of all cars traveled at 45 m.p.h. or faster.

3.58% of all cars traveled between 15 and 45 m.p.h.

2.64% of all cars traveled at 15 m.p.h. or slower.

The actual length of the restricted sections on the two hills, insofar as passing is concerned, is 3.13 miles. From the above figures it was determined that the average loss in time to each vehicle traveling over 15 M.P.H. was 18.7 seconds per car trip or 7 hours 42 minutes for all traffic per 24-hour day. This would amount to almost 400 miles of "travel loss" to the motoring public every 24 hours. It is self-evident that the addition of a "slow lane" for trucks would be a desirable feature of future reconstruction.

#### FEDERAL AID SECONDARY HIGHWAY SYSTEM

During the first half of the past two-year period the work of classifying and selecting a partial Federal Aid Secondary System was completed, and in August of 1941 final approval of the roads selected was received from the Public Roads Administration. For those not familiar with the Federal Aid Secondary System, a brief outline of its development is presented.

During the past several years the National Congress recognized that in addition to providing funds for the main transcontinental highway system, some provision must be made to build feeder or access roads leading to them. Accordingly a small allocation was made each year for the construction of secondary roads and the roads constructed under this set-up have been included in the partial Federal Aid Secondary Highway System. As authorized under Congressional Act, the secondary system could amount to 10 percent of the total rural mileage of the entire State.

In order to select the routes to be included in the system and to determine priority of construction, a special study was made by the Planning Division. Utilizing the data gathered during the 1936-1937 rural inventory it was possible to determine the total road mileage in each county and the traffic over each section of road throughout the State. From a total State mileage figure of 20,000 miles (using round figures) a total of 2,000 was determined as the ultimate secondary mileage. In order to allocate this mileage among the seventeen counties, two factors were used:

(1) The rural population of each county as a percentage of the total

population of the State, based on the official 1940 census.

(2) The rural vehicle-miles in each county (exclusive of the vehicle-miles on the Federal Aid Primary System, Forest Highways, etc., in each county) as a percentage of the total rural vehicle-miles of the entire State, based on actual road logs and traffic counts from the 1936-1937 field inventories.

These two factors, given equal weight, were used to determine the percentage of the total mileage to be allocated to each county.

Because present appropriations are so small that only about 1 percent of the total or about 20 miles of secondary road can be built each year, it was decided to select and designate not to exceed one-half the total available mileage, bearing in mind the tremendous change in travel characteristics during the past twenty years and allowing ample room for amplification and modification in the future.

Having determined the mileage available to each county, actual selection of routes was governed by a number of factors. First a review of the possible secondary routes was made and all those which were potential Federal aid routes were eliminated as were those serving recreational areas, airports, etc., and others having certain single purpose characteristics were declared ineligible. The purpose for this elimination was to avoid including in the Secondary System any routes which might be constructed with other funds or which were not principally mine-to-market or farm-to-market roads. In the consideration of roads to be included in the Federal Aid Secondary System, no distinction was made between designated State highway and county roads. Also, no consideration was given to road types or the condition of roads. A complete study, using the Highway Planning Survey factual and mapping material, was made of all rural roads that were eligible for selection, with consideration being given to reports and recommendations made by the Farm Bureau, County Commissioners, and other civic bodies. Considerable study was made relative to roads serving territory which is considered submarginal from an agricultural standpoint. Average daily traffic, potential traffic, and population also served as a guide.

A total of about 40 percent or 800 miles of the Secondary System was thus selected and maps of each county were prepared showing the routes chosen. These maps, together with a 95-page report, were submitted to the Public Roads Administration and their approval secured.

#### **COOPERATIVE SURVEY—PACIFIC TELEPHONE AND TELEGRAPH**

In the fall of 1940, the Pacific Telephone and Telegraph Company began preliminary surveys for the laying of a cable across the State of Nevada. One of the first operations was the taking of a flight of aerial pictures over the entire proposed route, which followed closely along U. S. Highway No. 40 for the greater part of the distance. Through contacts with the Planning Division, established while the Pacific Telephone and Telegraph Engineers were securing maps and survey data, a cooperative program was arranged under which personnel from the Planning Division, familiar with geodetic control across the State, was to identify points about every four miles along the route, extend control to these points through triangulation, and compute the longitude and latitude of each. In return the Telephone Company

was to supply the map data compiled from the control by the Fairchild Aerial Corporation and one set of pictures over the entire route. A one-man party finished the field work in less than six weeks and the office work in less than a month, thus securing pictures and mapping data worth many thousands of dollars at a very nominal cost. Much of the data obtained was used to good purpose during the planning, design, and reconstruction of U S 40 during the past two years.

The map of Reno-Sparks, showing the congested culture outside of the incorporated limits, was also prepared from this data and is perhaps the most comprehensive and accurate map ever made of this area.

#### INFORMATIONAL CHARTS

In order to provide a ready means of referring to the condition of certain features occurring on those roads comprising the strategic military network in Nevada, the Planning Division has prepared straight-line diagrams or charts showing, for the entire length of each of the various U. S. Routes involved, such information as:

- Mileage (rural and urban).
- Pavement types and widths.
- Right of way widths.
- Traffic density.
- Gross weights of vehicles.
- Inadequate bridges.
- Restricted clearance on bridges.
- Excessive grades.
- Excessive curves.
- Restricted sight distances.
- Fatal accidents.
- Mountainous or nonmountainous terrain.

These charts make it possible to determine immediately what conditions to expect at any point in respect to traffic density, bridge capacity, vertical or horizontal clearances, road types, steep grades, etc. Data in regard to restricted sight distance, excessive curves and mountainous or nonmountainous country, etc., have a definite bearing on the length of time required to travel the route, while bridge capacities and clearances determine the size of vehicles and loadings which can be safely transported over each section of road.

These charts were requested by the Public Roads Administration, and prints of them are furnished that agency for the dissemination of the pertinent data to the proper military authorities.

#### TRUCK WEIGHTS

In October of 1940 a study was made as to the licensing, loading, and traveling habits of commercial vehicles. Three platform type pit scales had been installed at Reno, Wells, and Las Vegas during the original 1936-1937 State-wide traffic survey, and these scales were used in weighing the vehicles. The study, or survey, was continued throughout the twenty-four hours of the day and for five consecutive week days at each of the above scale locations.

Among the pertinent information recorded and tabulated were such data as follows:

- State of registration.
- License number.
- Year model.
- Type of vehicle and fuel used.
- Rated capacity of vehicles.
- Name of operator.
- Tire arrangement and size.
- Origin and destination of trip.
- Axle weights.
- Total weights.

From the results of this survey it was possible to study the habits of truck operators as to licensing and loading, although no attempt was made during the survey to enforce licensing or loading laws. It is interesting to note that relatively few violations were encountered, there being only a few overloaded vehicles and practically no axles on which the load per inch width of tire exceeds 600 pounds. Also of interest is the fact that the ratio of net carried load to manufacturer's rated capacity was found to be highest in the  $1\frac{1}{2}$  ton to 5 ton rated capacity group rather than, as might be expected, in the group of lighter vehicles ranging from  $\frac{1}{2}$  to  $1\frac{1}{4}$  tons.

#### TRAFFIC

The most reliable criterion for judging highway needs and improvements is probably that of traffic. For example, it has been found that revenues from the gas tax approximate one dollar per year per vehicle per day per mile of road, and consequently only those roads having a traffic of from 250 to 300 cars per day return sufficient gas tax funds to pay for maintenance costs. One of the principal duties of the Planning Division is the collecting and tabulation of traffic counts on those roads carrying the majority of travel in the State, or being potential heavily traveled roads. These data are collected by five different methods as outlined below:

(1) Continuous counts are taken at 13 carefully selected stations on the principal highways by "fixed" type recorders, which operate 24 hours daily and record the daily traffic by hourly totals.

(2) Counts are taken at 156 other stations by use of "portable" counters which are installed near important intersections or where traffic is of sufficient importance to influence the over-all traffic picture. These counts are secured by rotating twelve portable counters among the 156 stations for four weekly periods per year, thus securing a count during each of the four seasons. This method has been found to give a very dependable yearly average of traffic passing any point.

(3) Manual counts are taken at 78 stations over a 16 hour, 7 day period during the latter part of each July. These counts, taken at principal intersections, near State lines, etc., cover 254 road sections. During these counts operators record the traffic by hours, indicating direction of travel and classifying vehicles into passenger, light, medium, and heavy trucks, combination truck and trailer, and busses. These are in turn broken down into local and foreign by registration.

The purpose of the July count is to furnish a comparison of traffic density year by year and to obtain factors for the different types of traffic which can be applied to the counts taken at the fixed and portable stations, so that these counts can be classified. The results of the July counts are published each year in a specially prepared booklet which gives the count at each station over a nine-year period and the percentage increase or decrease over the preceding year's travel.

The percent of increase or decrease of total traffic over each preceding year as indicated by July manual counts is as follows:

1937 to 1938.....	3.22 percent
1938 to 1939.....	10.74 percent
1939 to 1940.....	4.32 percent
1940 to 1941.....	7.77 percent

Table shows location and annual daily traffic for each of the stationary automatic recorders for the fiscal years 1938, 1939, 1940, and 1941, with the total percentage increase or decrease by years.

(4) Manual counts are taken during January of each year at each of the fixed recorders. These counts are for a 16-hour period and classify traffic into the same vehicle types as does the July count. The January count is necessary in order to record winter travel characteristics and develop factors to apply to the July counts so as to determine yearly traffic figures by types. In 1941 similar 16-hour counts were taken at each of the fixed recorders in April and October as a means of checking the reliability of applying the factors from the July and January counts. The results so closely paralleled those obtained by using the July and January counts that the midseason counts were dropped for 1942.

(5) Special counts are taken as the need arises, either by manual recording or portable recorders. The following special counts were taken during the last two-year period:

In December of 1940 special counts were made in the vicinity of Carlin to provide data to support the recommended realignment of U S 40 in that vicinity.

Several special counts were made in the Las Vegas area for the purpose of determining traffic-carrying requirements of proposed new highway construction to the defense plant area. One of these counts, taken at the intersection of U S 95 and the road to the magnesium plant, showed a peak hourly traffic of 1,667 cars, or approximately one every two seconds.

Special manual counts were made in Las Vegas at each intersection along Fremont Street, between 5th and Charleston, and along 5th Street between Fremont and Charleston in order to study traffic characteristics from which to plan for future highway development toward relieving the congestion existing between Las Vegas and the magnesium plant. Of these counts, the one taken at 5th and Fremont, the busiest intersection, showed a peak hourly traffic of 1,355 cars passing the intersection between the hours of 4 and 5 p. m.

A special manual count was taken near the Las Vegas airport on U S 91, and military and civilian traffic was recorded in order to determine adequacy of present highway facilities.

A special count was taken in the Las Vegas wash area to determine characteristics of travel to the manganese deposit. This information

was useful in determining design of proposed construction to the Three Kids mine.

Several counts were taken near the Lemmon Valley area to study traffic and provide data for planning construction of the highway from Reno.

A detailed report for traffic during 1940 and 1941 has been prepared giving data for all counting stations covered during each of these years. This information is available for public review upon request.

## FINANCIAL

The continuing work of the financial section covers three subjects, namely, the continuing fiscal survey, the preparation and submittal of monthly and annual statistical reports as required by the department and Public Roads Administration and the Road Life Studies.

### FISCAL SURVEY

The continuing phase of this survey consists of compiling the fiscal data for each class of local taxing units for street and road purposes. There are 42 local taxing units in the State comprised of 17 counties, 12 incorporated cities, and 13 special districts. The 13 special districts cover unincorporated cities and towns that levy or expend funds for street or road purposes.

### STATISTICS

This item covers the work of preparing and submitting monthly reports on the State motor vehicle imposts. The three major imposts are (1) motor vehicle fuel tax, (2) carrier license fees, and (3) registration fees. We are reproducing Table MV-I, showing the comparison of monthly and cumulative collection of the three State motor vehicle imposts for the fiscal years 1941 and 1942.

The preparation of annual statistics requires considerable time and work. In addition to the three above items to be reported, numerous road mileage reports are required. At the end of 1941 a detailed Federal Aid Road Log was prepared.

This log permits the identification of each section comprising any one of the 16 routes in the Primary State—Federal Aid Highway System. The lengths are given to the nearest thousandth of a mile, the surface is detailed for type and width, mileages are broken at city or town limits and at the junction of other routes. In addition to the foregoing, other allied information is shown that is of importance to the public roads or State highway officials.

### ROAD LIFE STUDIES

These studies involve an endless task due to the never-ending changes resulting from constructing and reconstructing the network of highways. It would require a fair-sized volume to endeavor to set forth the ramifications of the Road Life Studies, so the subject will be covered briefly.

In these studies there is a complete record of all State highway construction and reconstruction. All the details are recorded of the construction features, cost and source of funds, retirement and replacements by reconstruction.

The Road Life records are the source of information for the preparation of the log data mentioned under Statistics.

Table RL-I shows the mileage by type of the various subsystems comprising the State highways as of December 31, 1941.

### DESIGN—SURVEYS AND RECONNAISSANCE

In anticipation of the preparation of plans and estimates for the construction program two survey parties have been kept busy throughout the biennium. Location surveys have, as in previous periods, included surveys for all types of highway construction and reconstruction on the heavily traveled highway routes as well as surveys for feeder road projects.

Due to more elaborate roadway designs necessary because of ever-increasing traffic of all types and to the safety of that traffic, location surveys are much more extensive and require considerably more detail work than formerly.

On relocation surveys of the primary routes an especial effort has been made to establish as nearly as possible a permanent location of the highway. Not only has an attempt been made to decrease the curvature and grades when reconstructing the older highway sections, but when surveying for new construction, the same type of location in keeping with modern highway design is adhered to. This type of location will minimize old road scars and utilize practically all excavation work performed on previous construction.

In the appendix is a table showing the total amount of surveyed mileage, segregated by the several counties, completed during the biennium. No attempt has been made to segregate the surveyed mileage into heavy or light construction projects. In this table, the miles of surveys as listed include only the adopted mileage over which construction is anticipated and excludes all preliminary and alternate surveys sometimes necessary to determine the most feasible and economical location. The cost of preliminary or alternate surveys and the cost of surveys for obtaining special or additional data on various difficult sections is included in the cost of the surveys. Preliminary and alternate surveys are necessary on certain projects and are a definite part of the ultimate survey costs, and therefore are prorated into the projects on which they occur, and are included in the per-mile cost and total costs of surveyed mileage for the biennium.

### DESIGN—ROADWAY

Basic design principles have become more nearly stabilized during this biennium and few radical changes have been inaugurated. Progressive improvements have been made, however, in features to provide more modern facilities on the primary system. These improvements incorporated in designs have permitted increased speeds with a larger degree of safety and comfort. Considerable progress has been made in converting those portions of major highway routes which were rapidly approaching obsolescence into modern, safe highways.

When the defense program got under way in 1940, it was realized that a number of access roads to war industries and materials would be required as well as a concentration of work on the weaker sections

of the strategic network of highways designated by the War Department. It also became apparent that this work, in order to be of greatest service, should be completed at an early date. Consequently, a thorough study was made of all highways in the State to determine their acceptability for military use. In this study was included probable new roads necessary for defense. As a result a rush program of designs for essential projects was started. Design crews put in long hours to complete plans, and enabled the department to contract a large volume of work as funds became available.

During the biennium the first four-lane divided highway in Nevada was designed. Plans for this highway between Las Vegas and Boulder City had been contemplated for some time, but the advent of war and the start of construction of the huge magnesium plant southeast of Las Vegas occasioned a very large increase in traffic and added impetus to the preparation of the plans.

Every effort of the department has been bent to promote the War effort through adjustments which would increase the utility of the highway system both for civilian and military purposes. While this has not affected the basic design of Nevada highways, it has made necessary the substitution of many new materials and methods for those previously accepted in order to avoid the use of items which were more essential to other phases of the War. Such changed designs have not always resulted in the true economy inherent in standardized practice but they have enabled the department to continue the construction of vitally needed highway facilities with a minimum of interference with other equally essential phases of War construction. As an instance, the use of metals of all kinds has been practically eliminated; metal culvert pipes, reinforced concrete, structural steel, and other metals have been replaced with plain concrete, rubble masonry, or timber. About the only metals now used in highway and bridge designs consist of minor amounts of nails and wire for joining timber.

These substitutions have in some cases resulted in the use of materials which have a more or less limited life. In this event, designs have been prepared so that the item may be replaced at a minimum of cost and inconvenience when the emergency is over.

In order to secure the greatest possible usable mileage, some normally highly desirable features have been omitted from designs to secure a lower first cost. Items so eliminated have been such that the usability, load capacity and safety of the highway have not been impaired, but have been those which could be deferred and performed at a later date. Among these are many roadside improvements and other similar items.

The effect of the War has been greatly felt in the personnel of the design department, many men having been either called into military service or loaned to other agencies lacking skilled engineers.

## **DESIGN—BRIDGES AND GRADE SEPARATION STRUCTURES**

During the first part of the biennium, bridge design and construction continued normally, but during the last part a great change has been made due to the preparation and progress of the War.

It has become necessary to do without steel as far as possible. This

requirement has turned our attention to timber and plain concrete. Early in the emergency we reverted to standard timber bridges, which had not been used at all in the previous biennium, and to laminated timber boxes. Later, in order to save additional hardware and timber, boxes were made with plain concrete abutments and piers and laminated timber decks. The latter type has the advantage that the timber deck may be removed and replaced with a reinforced concrete slab when steel becomes more available. Another type of structure being used is the plain concrete arch. In designing these structures they are considered as similar to stone masonry arches which have not been in general use in the last forty years. These structures use no steel except that which is required for forms. Plain arches are limited to locations where there is ample headroom as they require a minimum of two feet of fill above the arch. The standard has a maximum span of ten feet, but several multiple spans have been used making them bridge size.

The fourteen new structures and the four structures widened during this biennium cost a total of \$204,958, which is considerably less than the cost for the same number of bridges constructed during the previous biennium because the length of the bridges is less. The cost per foot of bridge during the biennium is higher, being \$206 per foot as against \$178 last biennium, an increase in cost due to higher cost of materials and to the use of more costly types of structures in order to save steel.

A new overpass was constructed on the highway to Ruth, where both the highway and railroad traffic is heavy. The construction was desirable as a safety measure. Two overpasses on U S 40 were widened from 20 feet to 28 feet and the approaches improved in alignment and grade. The old underpass at Silverzone on U S 40 was abandoned and a new one called the Cliffside underpass was built to replace it. The width was increased from 20 feet to 30 feet and the sight distance improved. A new concrete bridge south of Searchlight on U S 95 was built, completing the connection of U S 95 to the south. On U S 395 south of Gardnerville, a canal bridge was widened from 20 feet to 40 feet, one of the few bridges on which the bridge width is equal to the width of the roadbed, an improvement which we should look forward to as an ideal for the future. Another bridge of roadbed width was built on U S 40 east of Golconda, a rigid frame concrete span.

The above structures were built before the emergency required reduction in the steel used. Since then the following bridges have been built or are under construction. Three timber bridges are under construction between Battle Mountain and Austin, adding another improvement on the north-south route which should eventually carry considerable traffic. On U S 93 between Las Vegas and the new magnesium plant two bridges with plain concrete piers and abutments and laminated timber decks are being built. On this highway, and also on the highway from Luning to Brucite, or Gabbs Valley, four bridges consisting of multiple spans of plain concrete arches are being built.

#### RIGHT OF WAY

The Defense Highway Act of 1941 contained two provisions, at least, that were of major importance to the Right of Way Division. For the

first time, Federal aid allowance has been made for right of way expenses as part of the construction costs of strategic network highways or grade crossing elimination projects. To date, however, no occasion has arisen wherein the request for Federal participation in right of way costs has been deemed proper. Included in reimbursable right of way costs are the expenses of examination and abstract of title, certification of title, advertising, considerations paid for land acquired, and field work of right of way personnel. The 1941 Defense Highway Act, also, made provision for the construction of additional facilities in connection with the public highways, to be available for the landing and take-off of aircraft. The acquisition of new or additional lands necessary for such flight strips, as they are called, may to the extent determined by the Federal Works Administrator, be included as part of the construction thereof, and Federal funds shall be available to pay the cost of such acquisition. The total cost of flight strips, without regard to apportionment among the several States, may be paid by the United States. One location for a flight strip within the State of Nevada has already been approved.

A number of condemnation suits in various parts of the State have been instituted during the last biennium. In most instances an amicable settlement of the case has been possible upon the completion of the highway project when it became evident to the land-owner improvement resulted therefrom to his property. An additional one hundred feet of right of way, paralleling the existing highway, from Las Vegas for a distance of ten miles toward Boulder City, was acquired entirely through agreement with the property holders and in general at a price equivalent to twice the assessed valuation of the land taken where there were no improvements to be moved for the accommodation of the highway; in the latter instances, of course, the State had to assume the moving costs.

Agreements with property owners prohibiting the erection of signs or improvements, and for the construction of channel changes or ditches, adjacent to the right of way limits of the State highways, have been consummated in numerous instances.

New maintenance sites acquired for the erection and enlargement of maintenance stations are listed in the appended tables.

At the close of this biennium the department had acquired a total of 17,698.49 acres of privately owned land at a cost of \$272,639.14, or at the rate of \$15.40 per acre. Acquisition of Government-owned lands in the amount of 95,004.46 acres has been secured at no cost whatsoever to the State of Nevada. The average unit cost of all lands acquired for right of way purposes was \$4.87 per acre.

### MATERIALS TESTING AND RESEARCH

The Materials and Research Division of the State Highway Department during the biennium did about the same amount of work as in the previous two-year period. However, there was an increase in the amount of field testing and inspection.

As stated in previous biennial reports the functions of the division are to write and compile specifications for materials, investigate sources of supply of various types of aggregates and water, to investigate subgrade and to make studies of the behavior of the materials

already in service, also to test and inspect all materials entering into construction, and finally to report all findings resulting from the investigations, tests, and inspection.

During the latter part of the biennium there were fewer samples of metallic materials due to shortages caused by the emergency. These shortages of certain strategic metals have led to the development of substitutes. A great deal of work has been done on determining the suitability of various proposed substitutes, and where suitable ones were found writing specifications to cover them. Among the materials substituted are plain concrete pipe for metal pipe, white paint for aluminum paint, white lead pigments for zinc pigments, iron oxide pigments for red lead pigments, and new vehicles for both paints and lacquers.

Increase in field inspection work and in field testing has been due to two factors (1) greater use of plantmix surfacing, and (2) the placing of more and more emphasis upon the importance of compaction of embankment and subgrade. Both of these operations are refinements over older and cheaper methods of surface and subgrade construction, hence require closer control and supervision. At least one member of the testing department and sometimes two are kept busy during the height of the paving season on this phase of the work alone.

Until a few years ago, field tests were relatively few, and were principally of one kind, namely, sieve analyses to check the size grading of surfacing gravel for all roadmix jobs and paving mixtures on the relatively few plantmix jobs undertaken at the time.

At present, both the kind and number of field tests have increased considerably. Every kind of aggregate is tested in the field at the time it is being prepared to see that it meets specifications for size grading. Thus better control is secured on base courses as well as surfacing materials. Moisture tests are made at the job site on the aggregates and on the treated surfacing whenever necessary. Tests are now made daily, or rather continually, during grade building operations to see that the embankment and subgrades have received the proper amount of compaction. All of these tests are called "control tests" and necessarily are made right on the job. To send all control samples from great distances to the central laboratory would be impracticable and uneconomical. A control test to be classified as such must be performed concomitantly with the operation it is supposed to control.

Control tests of aggregates are not to be confused with tests which involve the acceptability of a material deposit. Whether or not a material deposit is acceptable depends upon a number of selective qualitative tests in addition to sieve analyses, and such tests are made in the central laboratory at Carson City prior to the time the deposit is worked.

The field testing has involved the setting up of a field laboratory with a set of testing equipment complete enough for the kind of tests required on each particular construction project. Also each project must be supplied with personnel trained in testing. While training of the personnel and a certain amount of field supervision is a responsibility of the Materials and Research Department, the personnel are directly responsible to the project engineer.

New equipment added in the Headquarters Laboratory during the biennium consists of a stabilometer and other smaller items. The stabilometer is used to measure the relative stability of various asphalt mixtures. To improve efficiency and save time in the field testing, a number of sieving machines operated by gasoline motors were constructed in the department shops. These machines are transferred from one project to another as they are needed.

As the Highway Department has the only materials laboratory in the State, other State, municipal, and Federal agencies have their testing work done in this laboratory, and during the past biennium samples have been tested for the Naval Ammunition Depot at Hawthorne, the U. S. Army Engineers, the Civil Aeronautics Authority, the Indian Service, the Forest Service, most of the cities in the State, and some of the counties. A charge which covers only the cost of labor involved and materials used is usually made for this outside work.

Many materials such as cement, timber, structural steel, and concrete pipe are tested and inspected at the source, sometimes by a member of this department and sometimes by a commercial testing agency, or in certain cases by the highway testing laboratory of some neighboring State, such as California and Utah.

The following table shows the approximate number and the types of materials tested in the laboratory at Carson City. The table does not include the field tests, several thousand of which were performed during the biennium.

<i>Concrete Materials—</i>		<i>Bituminous Materials—</i>																																											
Cement	148	MC-0	8																																										
Concrete sand	124	MC-1 and 1A	145																																										
Concrete gravel	113	MC-2	112																																										
Mortar sand	29	MC-3	3																																										
Water for concrete	36	MC-4	22																																										
Concrete pipe	26	MC-5	15																																										
Concrete cylinders	1,549	RC-2	76																																										
		SC-0 and 1	2																																										
		SC-1A	3																																										
		SC-2	18																																										
		SC-3	420																																										
		SC-4	89																																										
		SC-5	181																																										
		SC-6	173																																										
		Emulsions	10																																										
		Miscellaneous	13																																										
<i>Metals—</i>		<i>Miscellaneous Materials—</i>																																											
Reinforcing steel	198	Rock for riprap rubble																																											
Wire mesh	21	masonry, etc.	28																																										
Barbed wire	19	Expansion joint	28																																										
Structural steel	11	Brick	29																																										
Castings	14	Hollow building tile, etc.	19																																										
Metal cribbing	5	Asphalt plank	1																																										
Steel piling	2	Asphalt expansion joint																																											
Guard rail	11	filler	2																																										
Corrugated metal pipe	788	Blotter sand	4																																										
Copper seal	10	Roofing tile	1																																										
<i>Surfacing, Base, Etc.—</i>		Surfacing and base	1,789	Top soil	10	Borrow	118	Creosote	11	Screenings	37	Water-proofing materials	9	Backfill	17	Extractions bituminous		<i>Soils—</i>		materials	174	Physical and chemical tests	2,285			<i>Chemical Analysis—</i>				Water	36			Paints	185			Miscellaneous analyses	43			Mineral determinations	62		
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Borrow	118	Creosote	11																																										
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## ROADSIDE IMPROVEMENT

The last comprehensive roadside improvement project to be completed in cooperation with the Federal Roads Administration using Federal aid funds, was the treatment of the section of U S 40 from near the California State line to within a few miles of Reno. This work was undertaken in November 1940 and was completed in June of the following year.

The principal feature of this roadside development project was the construction of a roadside parking or picnic area about one-half mile west of the town of Verdi. The reconstruction and realignment of U S 40 west of Verdi left a considerable area on the south side of the highway available for other than roadway purposes. Since this property had been acquired by the State, a parking or picnic ground was constructed. This project included the installation of 13 outdoor fire places, with the same number of substantial picnic tables and benches. Parking areas, driveways and walks were laid out and the grounds graded and landscaped. A natural spring of pure water was developed and the water piped to convenient places about the grounds. Garbage disposal receptacles and convenience rooms were installed. Maintenance and policing have been taken care of by the Division Maintenance crews.

The park, named "Crystal Peak Park," has proven to be a most attractive feature. A great deal of favorable comment has been received by the Department of Highways, and before the national emergency arose the park and its facilities were in use almost constantly, especially during the spring and summer months.

Further roadside improvement projects were contemplated and plans completed for at least one other unit, but the freezing of Federal aid highway funds for such development prevented any further work along this line. However, a general survey of the State was made to locate sites for similar developments. Several tentative sites were chosen, and these could well be included in the program for post-war activities.

Experiments on seeding for ground cover were continued for a time and some work was done on experiments with a chemical in an attempt to find a cheap but satisfactory method of weed control on highway shoulders.

A large number of shade trees were planted along U S 50 west of Fallon and along U S 40 west of Lovelock, to replace former plantings which had proven unsatisfactory. Only trees of a variety which had been proven adaptable to the climatic and soil conditions prevailing in the respective localities were used and the results so far have been most encouraging.

All work pertaining to roadside improvement, except that included in the regular design of new construction, has been discontinued since the entrance of this country into the War.

## TRAFFIC AND SIGN DIVISION TRAFFIC LINE

Probably the most outstanding accomplishment of this division during the biennium was the marking of 3,345 miles of highway with a 4" white center line, and over 225 miles of yellow barrier, or "no passing"

zone line. The white center line on our highways has been conceded to be one of the most valuable safety devices in use upon the roads today. Its benefits are two-fold, in that it tends to keep traffic in its proper lane and at night, especially during stormy weather, it is an invaluable guide for motorists. The yellow barrier line has been instrumental in the prevention of numerous traffic accidents, for when it is observed by the motorist and its intent heeded, passing of vehicles from the rear on blind curves and crests is controlled.

The application of the white center line necessitated the surveying and marking of approximately half of the mileage with a pilot line, and the measurement and spotting of all the mileage for the yellow barrier line. The remaining mileage of white line was retracing or repainting of existing line which had become dim or obscure from weather, heavy traffic, or to reconditioning of the highway surface. Over 40,000 gallons of traffic lacquer were purchased and used in applying the traffic lines.

#### SIGNS

The sign production unit which was started during the last biennium has been completed. It is now housed in a new building, at the Reno equipment yards, and is fully equipped to turn out almost any type of sign desired on the highways of the State. The equipment of the sign production shop includes an electric baking oven for enamel signs, steel cutting and punching machines for shaping the signs and making the openings for the insertion of the reflector buttons.

At the end of the biennium, June 30, 1942, there was on hand in the sign department 1,759 standard or stock signs. This supply is closely watched, and as the supply is depleted by use, a new supply is made up, based upon the number of such signs used over a period of time. Thus it is nearly always possible to meet the needs of the several divisions without delay. In addition to the stock of signs on hand, there were 1,095 standard reflectorized signs, 1,267 unreflectorized signs, 122 special oversized reflectorized signs, and 422 special oversized unreflectorized signs constructed and distributed by the sign department.

Road maintenance of signs has been found necessary and this has been done by a man with a light truck traveling the highways and retouching and repairing signs in place. Practically three out of every four signs are found to need either repairing or touching up. A great deal of this maintenance is necessitated by vandalism. Either the signs are shot at by motorists or the reflector buttons broken or stolen.

A new system of informative signing on the principal highways of the State has been inaugurated by this division. Signs have been erected at short distances outside of the population centers, informing the motorists of the route upon which he is, and the direction in which he is traveling. This feature has brought in more unsolicited favorable comment than almost any other single item of roadside treatment.

Another special activity has been the construction and installation of 150 signs with the caption "Help Prevent Fires and Aid Defense." These signs were made and erected in cooperation with the Office of Civilian Defense and the U. S. Forest Service. They have been placed at points along the highways recommended by the Forest Service

and Grazing Service as being in the areas most susceptible to brush and timber fires. It is hoped that these signs will remind motorists and others of the dangers of brush and forest fires, and by being careful about the careless throwing of matches and cigarettes, prevent great economic loss and the diversion of man power vitally necessary to the War effort.

#### TRAFFIC ACCIDENT RECORDS AND ANALYSIS

The system of accident records and analysis, set up in accordance with the National Safety Council standards, has been continued by this department, but owing to the curtailment of funds, no publicity of statistics has been given by this office.

#### FINANCE—OPERATION

Receipts and disbursements for the biennium as shown by the financial tables are comparable to the previous two-year period.

State revenue from one additional source was received during the fiscal year 1942—the driver's license fee which was made possible by chapter 190 of 1941 Statutes. The revenue received from the driver's license fee has been used to pay for the cost of administering the Act.

Subsequent to April 1, 1941, the department has made no expenditures on certain of its activities consisting of the safety division, publicity and advertising, Highways and Parks magazine, landscape, architect department, and the highway patrol. Although given the power by the 1941 Legislature (chapter 184) to incur expenses in the publishing of the Highways and Parks magazine, to promote tourist travel into and through the State, the publication has been discontinued.

The duties of the highway patrol were taken away from the department by the 1941 Legislature and the Public Service Commission was delegated with the power to appoint inspectors for the enforcement of the collection of fees pertaining to the registration of motor vehicles. Cost of the administration of the Act to be paid from the State Highway Fund but not to exceed 15 percent of the amount collected from common carrier licenses. Some patrol work is being carried on by the department, that is, the patrolling of two highways leading to defense projects—one from Las Vegas to the Basic Magnesium Plant and the other from Reno to the Reno Air Base at Lemmon Valley. The cost of this work for the biennium is carried under traffic and sign department.

The last of the principal and interest on the State Highway Bond issue of \$1,900,000 was paid during the biennium, thereby clearing the department of all highway bond obligations.

After more than two years of operation of the International Electric Business Machines, which we described in our last biennial report as being installed in the department, we have found them very beneficial, not only to the accounting division, but in compiling data for all departments.

In the table of Federal Aid Allotments we have not included the amount of access funds made possible by the Defense Highway Act of 1941 for work on defense highway projects, as no State is allotted any given amount, but funds are set aside for each State based on projects

certified to by the War Department. On June 30, 1942, we had under agreement \$1,143,513 of these funds.

The U. S. Treasury Department, through the Public Roads Administration, has again, as they did in 1933, granted to the States the privilege of requesting an advance of funds in order to promptly pay contractor's estimates. The department took advantage of this privilege, and made the necessary request, and was given an advance of \$600,000 which was deposited with the State Treasurer as a special fund designated as "Trust Account Defense Highway Act of 1941."

Tables showing receipts and disbursements for construction, maintenance and operation are appended.

### **FINANCES—MAINTENANCE OPERATIONS**

For administrative purpose the State Highway Department consists of five field divisions, each headed by a division engineer, with an assistant, and the headquarters office in Carson City.

The division engineers, cooperating with the maintenance engineer, are responsible for the proper upkeep on all roads in their respective divisions, which are a part of the State Highway System.

It is the duty of the maintenance engineer to coordinate all maintenance operations between the divisions and the headquarters office, to recommend needed improvements and developments in each district, to obtain uniformity in certain maintenance methods and practices, and to keep the division offices informed on money expended, that budget estimates may be kept within bounds. Regular reports are submitted each month to the Highway Engineer on finances and operations appertaining to the maintenance operations.

The State Highway System is regularly inspected by an engineer from the Public Roads Administration and the State is required to maintain to Federal standards all roads which have received Federal aid in construction. This includes bridges, over and underpasses, and culverts and all appurtenances such as marker and guide posts, guard-rail, and signs.

The maintenance budget is prepared in June of each year for the ensuing fiscal year July 1 to June 30. Funds are set up in this budget for general maintenance, bridge maintenance, betterment work, and any administrative costs which may be charged against maintenance operations in each division. An emergency reserve fund is set up for snow removal or extraordinary maintenance due to floods, cloudbursts, etc.

During the past two years one new division headquarters yards, shops and office building has been completed; also one new maintenance station with garage and residences, several new garages for maintenance stations, and additions and improvements to the maintenance residences. Springs have been developed for domestic use, a softening plant installed, and automatic electric plants installed in some isolated locations.

Each year the State system shows an increase in its mileage which must be maintained with no increase in funds allotted thereto. Owing to a decrease in gas tax receipts, noticeable during the last half of the fiscal year 1941-1942, rigid economy in operating methods have been enforced, and necessarily the usual maintenance practices have been

extended to cover the increase in mileage with no additions to personnel or equipment.

The maintenance section crews in all divisions have made every effort to keep highways open and to maintain the policy of assisting the motor bus and truck traffic in need of aid in an emergency. The cost of snow removal and repairing of washouts varies widely from year to year, depending on the intensity of the winter and frequency of floods.

Reference can be made to appended Table No. 7 for variation in snow removal costs, and to Table No. 6, column 2, for yearly additional mileage increase.

The appended tables show a complete record of all maintenance operations for this biennium, and also other interesting information concerning maintenance operations during previous years.

## DIVISION OPERATIONS

### DIVISION NO. I

Division No. 1, with headquarters in State-owned administration building, Las Vegas, includes that part of the State Highway System within Clark County and portions of Lincoln and Nye County, a total of 471.68 miles of State highways.

Satisfactory progress and accomplishments can be reported for Division I during the past biennium, 52½ miles of roadway having been constructed, 18 miles of which are plantmixed with treated shoulders. One overpass structure and an 80-foot bridge, both of concrete and steel, were constructed with the above mileage.

The only project now in progress which will continue into the next biennium is the four-lane construction between Las Vegas and the Basic Magnesium Plant. This job is the first four-lane construction in the State.

Normal maintenance was carried on during the biennium with no increase in personnel due to increased mileage. Roadmixing of 4½ miles of State Route 60 into Nelson was performed by maintenance forces.

A new plant was constructed by day labor in Las Vegas consisting of an office building, garage and shop, warehouse, blacksmith shop, paint shop, carpenter shop, equipment sheds, fuel station, and watchman's house on a 5.35-acre plot inside the city limits on North Main Street on Highway 91 which was purchased two years ago.

Total cost for the construction of the 52½ miles was \$650,506.41, 12½ miles now under construction is estimated at \$509,666.51, making a grand total of 65 miles for a cost of \$1,160,172.92.

Maintenance expenditures for the biennium amounted to approximately \$94,395 for the 1940-1941 fiscal year and \$94,956 during the 1941-1942 year.

There was expended \$58,000 for the new Division I plant, exclusive of the land which cost \$4,000.

### DIVISION NO. II

Division No. II, with headquarters in the Washoe County Library Building, Reno, includes that part of the State Highway System within Churchill, Douglas, Lyon, Storey, Washoe, and portions of

Lander, Mineral, and Pershing Counties, a total of 739.09 miles of State highways.

During the biennium, several sections of Highways U S 40 and U S 50, totaling 50 miles, were reconstructed with widened roadbed, wider plantmix asphaltic surface, and widened shoulders. In addition to the above, some 21 miles of the two highways were reconstructed with roadmix surface on widened roadbeds.

Five miles of highway, alternate U S 95, from Fernley south, was constructed, the improvement consisting of grading, drainage structures and a roadmix asphaltic surface.

Reconstruction of the highway from Virginia City to 5 miles northeast on State Route 17 consisted of reshaping the roadway, placing additional gravel surface, and constructing a roadmix bituminous surface.

In Virginia City, State Route 17 along C Street was improved for a length of 0.9 miles by the addition of concrete curbs and gutters and a roadmix bituminous surface 36 feet wide.

The portion of State Route 67, from the south city limits of Reno, along the extension of Wells Avenue, to the Reno-Carson City highway was constructed with a bituminous asphaltic surface 56 feet wide and concrete curbs and gutters.

Crystal Peak Park, constructed under a roadside improvement project and located on U S 40 west of Verdi, has been favorably received by tourists and picnickers enjoying the fireplaces and tables installed for their convenience.

Other improvements completed during this period include the building of an equipment storage garage at Yerington and the construction of a five-room frame dwelling, storage garage, and the remodeling of the old dwelling at the Bowers Maintenance Station.

In addition to the regular maintenance activities, considerable betterment work such as flattening cut slopes, widening shoulders, and placing additional wearing surface on many of the highways was carried out.

Snow removal has been very light in the valleys during the past two winters. However, the mountain highways which include Carroll Summit, the Clear Creek Highway, Spooner's Summit, and the Mount Rose Highway to the ski lift at Grass Lake necessitated the use of the heavier snow removal equipment.

The maintenance equipment has been improved during the period by addition of new trucks, motor graders, power shovels, and snow plows.

#### DIVISION NO. III

Division No. III, with headquarters in Elko, includes that part of the State Highway System in Humboldt County and portions of Pershing, Lander, Eureka, and Elko Counties, a total mileage of 606.97 miles of State highways.

During the biennium, five highway projects for which contracts had been awarded previous to July 1, 1940, were completed at a total approximate cost of \$773,000. Six projects were placed under contract and completed at a cost of approximately \$976,000. In addition, six projects were placed under contract for an estimated cost of \$1,266,656, but were incomplete on July 1, 1940.

The larger part of the construction and reconstruction work was performed on Highway U S 40. For the most part the work was heavy and of a high type. Curves were eliminated or flattened to a great extent by realignment, the grades reduced, roadbed generally widened to 38 or 40 feet, adequate base courses provided, plantmix bituminous surfaces 24 feet in width constructed, with shoulders stabilized by use of roadmixed bituminous gravel on most projects.

General maintenance was performed on the 606.97 miles of highways with maintenance crews at ten stations conveniently located in the division. Each crew consists of a foreman and from two to six equipment operators and laborers.

Equipment suitable for the needs of each crew is furnished and stored in State-owned equipment sheds and yards. At four isolated stations, dwellings for part or all of the crews have been constructed by the department.

Repairs for all maintenance equipment were made at the Elko shop located one mile east to Elko on Highway U S 40. Forty-seven motorized units and fifty-three units were in use at the close of the biennium. The shop crew consists of a foreman, two senior mechanics, one junior mechanic, one stock clerk, and one watchman.

#### DIVISION NO. IV

Division No. IV, with headquarters at the division office building in East Ely, includes the part of the State Highway System within White Pine County, and portions of Elko, Eureka, Lander, Lincoln, and Nye Counties, a total of 676.96 miles of highways.

Construction in Division IV during the biennium was curtailed because of war conditions.

The construction of the roadmix asphaltic surface on Highway U S 6, from the East Foot of Connor's Pass to Sacramento Pass, a length of 20.31 miles, was started in the previous biennium and completed early in this biennium.

A feeder road from Keystone Junction on Highway U S 50 to the copper mines at Ruth and Kimberly was completed, the improvement consisting of grading and roadmix asphaltic surface with an overpass over the Nevada Northern Railway near Keystone.

The feeder road from the junction with Highway U S 93 north of Pioche to Castleton, length 6.30 miles, a graded and gravel surface road, was completed in 1941.

Construction was started on 10.71 miles of graded and gravel surface highway on State Route 8A extending from 48 miles south of Battle Mountain to 30 miles north of Austin.

The highways in the division are now roadmix bituminous surface except the semiimproved gravel surface sections, Currant to Duckwater, Panaca to the Nevada-Utah State line, and Baker to the Lehman Cave, aggregating 56.50 miles, and the gravel surface highway from Highway U S 93 to Castleton, 6.30 miles.

A total of 677 miles of roadway is maintained within the division, and of this mileage 620½ miles is bituminous surfaced and 56½ miles is low-type gravel construction. The mileage of bituminous type surface has increased 27.8 miles during the biennium.

One headquarters maintenance crew varying from four to eight men

supplemented by ten section crews of from two to three men each, carry on all general maintenance work in the division. Sections are approximately 50 miles in length, and each crew is equipped with one or two trucks and snow plows. Additional equipment needed is furnished from the headquarters yard at East Ely, Nevada. General maintenance consists of snow removal, shoulder and surface repairs, drainage control, weed cutting and burning, building and yard repairs, sign repairs, and any other minor work necessary to maintain the highways and State property. The general maintenance work is carried on by a constant crew of 28 men, foremen, and helpers.

To care for special or complex work a swing crew is maintained. The swing crew, or crews, place all asphaltic seal, recondition all major surface failures, repair large wash-outs, rebuild shoulders, and prepare roadway gravel for oilmix stock piles. All members of the swing crew are used on snow removal during the winter.

During the two winters of the biennium, 1940-1941 and 1941-1942, snow removal was handled without trouble or delay to traffic. None of the summits or any sections were blocked for more than two hours. Pinto Summit, just east of Eureka, Nevada, has proven to be the worst summit in the division for snow, mostly drifting; however, an excellent crew with ample snow equipment at Eureka, supplemented by a Snogo from East Ely, kept the road open at all times.

Division IV experienced two major wash-outs during the two-year period. One between Caliente and Pioche on U S 93 in July of 1941, washed out one-half of the roadway embankment for a distance of 50 feet, scoured side ditches and shoulders, and filled drainage structures and ditches. A second flood occurred during February and March of 1942 west of Eureka, Nevada, and was caused by rapidly melting snow overlaying frozen ground. This flood scoured shoulders and washed out two or three feet of oil surface for a distance of 2,000 feet. In both cases maintenance crews were on the job all during the high water, and equipment to make necessary repairs arrived within a few hours. Traffic passed through the damaged areas under the control of flagmen and pilot trucks with little or no delay.

Approximately one hundred miles of highway has received an asphaltic seal, and 30 miles of oil surface has been reconditioned with a Hargrave Planer and motor patrol during the biennium. At the close of the 13th biennium, all roads in this division are in fair condition. Each section has an oilmix stock pile of from 200 to 500 cubic yards for future use in patching and reconditioning, and, also, as a precautionary measure in the event we should be unable to obtain asphaltic road oil for the duration.

At the close of the biennium, Division IV has an excellent equipment "set-up." All old trucks have been replaced, and three additional truck units placed at strategic points. Each truck is equipped with a snow plow, either blade or "V," and with both types available for the large four-wheel drive trucks. Three gas motor patrols were replaced with Caterpillar Diesel Motor Patrols. A  $\frac{3}{4}$ -yard Northwest Crawler type power shovel was received to replace an old Universal truck shovel. The oil storage and heating plant has been remodeled and put in first-class condition.

With a few exceptions, all equipment is less than two years old and

in excellent condition. Emphasis is being placed on proper care and operation of all equipment, and the entire personnel of the division is responding with their full cooperation.

#### IMPROVEMENTS

1. At East Ely, a sixteen section equipment storage shed was constructed in cooperation with the local W.P.A., all equipment being stored under cover.
2. Oil storage and heating plant was remodeled and new equipment installed, giving up-to-date and convenient oil facilities.
3. East Ely yard has been graveled, drained, and a landscape program started.
4. East Ely shop has been improved by adding new equipment and conveniences.
5. A new maintenance station consisting of water system, two houses, garage, and yard was completed at Illipah, Nevada, replacing an old run-down station.
6. The two houses at Ferguson Maintenance Station were remodeled and improved.
7. One house at Geyser Maintenance Station was remodeled.

#### DIVISION NO. V

Division No. V, with headquarters at Tonopah, includes the part of the State Highway System within Esmeralda County, and portions of Nye and Mineral Counties, a total of 553.10 miles of highways.

Construction projects completed during the biennium included the construction of 21 miles between Warm Springs and Sandy Summit and 10 miles between six miles east and four miles west of Millers, both on Highway U S 6, completing this highway to modern standards; the reconstruction of one mile over the Goldfield Summit improving alignment and grades; and the construction of 6.5 miles of State Route 69, between junction with State Route 8A and a point 1.5 miles west of Manhattan.

Contracts for the construction of the feeder road between Luning and Gabbs, formerly called Brucite, a distance of approximately 32 miles was awarded in April 1942, and will probably be completed this year. This road serves the plant of the Basic Magnesium, Incorporated.

During the fiscal years 1941 and 1942, State forces constructed a temporary road between Luning and Gabbs Valley along State Route No. 23. Approximately \$40,000 was spent on the work, of which the mining companies operating the mines near Gabbs contributed \$16,000. Practically all the work done by State forces on this route was incorporated in the permanent highway being constructed by contract with Federal participation.

Three miles of Highway U S 6, about 80 miles east of Tonopah, was reconstructed by State forces.

On State Route 47, between Silver Peak and Nivloc, 6.50 miles of highway was graded and gravel surfaced in cooperation with Esmeralda County and the mining companies operating at Nivloc.

Betterment work on State Route 3, both north and south of Goldfield, correcting drainage conditions was performed by State forces,

eliminating a source of expense and hazards to traffic which has existed since the original construction of this highway.

In addition to the general maintenance activities, 70 miles of the roadmix bituminous treated gravel surface was given an asphaltic seal in 1941.

Very little damage by cloudbursts was suffered in 1941, but during 1942 cloudburst damage occurred on State Route No. 3 south of Goldfield, on State Route No. 3A in Fish Lake Valley, and on State Route No. 47 between Silver Peak and Nivloc, the damage approximating \$6,500.

Snowfall during the past two winters has been light, and no difficulty in keeping the highways open was experienced. The snow removal costs for the two winters amounted to about \$8,500, a large part of the cost being in stand-by rental charges for snow removal equipment. During the biennium, new houses were constructed at the Willow Springs, Fish Lake Valley, and Sarcobatus Maintenance Stations.

At the Willow Springs Station on State Route 8A, 36 miles northeast of Tonopah, the house was built of concrete, using volcanic cinders for aggregate. This material has good insulating qualities, so that the house is cool in summer and easily kept warm in winter. In addition, a 24' x 40' sheet-metal garage was constructed, and a 1,500 watt light plant was installed.

At the Fish Lake Valley Station on State Route No. 3A, near Chiatovich Creek, 17 miles south of the junction with State Route 15, a modern four-room frame house and a 24' x 40' sheet-metal garage were constructed. A good well was drilled at this station and an automatic pressure water system operated from a 1,500 watt automatic generating plant was installed. At the Sarcobatus Station on State Route No. 5, about 29 miles south of Goldfield, a stone house was constructed and a 1,500 watt automatic generating plant installed.

The main house at the Basalt Station located at the junction of State Routes Nos. 10 and 15 was enlarged and modernized, and a 1,500 watt lighting plant was installed.

A new well was drilled at the Lida Station on State Route No. 3, furnishing an ample supply of good water.

Six small electric power-driven air compressors were installed at various maintenance stations, giving all outlying stations air for tires of motorized equipment.

Maintenance equipment in the division was increased and improved during the biennium by the addition of a Diesel tractor and carryall scraper, a Diesel tractor with angle dozer, a Diesel motor patrol, an 18-ton low-bed trailer, three 5-ton four-wheel-drive trucks, two 3-ton dump trucks, an asphalt distributor with 1,275 gallons capacity, a 2,600-gallon transport truck for hauling liquid asphalt, and several 1½-ton dump trucks and pickups.

## EQUIPMENT

The Equipment Division during the last biennium has continued to maintain a high standard in shop facilities, equipment, buildings, and personnel. The shop equipment previously installed at the Reno plant has been maintained in good condition, and has been increased

by the installation of new wheel alignment equipment which will aid greatly in the saving of wear on tires.

The buildings of the Reno plant have been increased by the construction of a 32' by 128'6" steel building which houses the equipment paint shop, the sign department's stock of signs, and its baking oven where highway signs are manufactured; it also houses the new wash rack, large enough to handle the department's largest equipment. The addition of the new building has given the machine shop additional room. The blacksmith shop will be moved into the quarters recently occupied by the old equipment paint shop.

The Reno plant, together with all the division shops, except the Tonopah shop, have installed twin post hoists of sufficient size to handle all of the equipment, including the snogos and the oil distributors. The machine shop has handled the larger portion of the major repairs to the department's 601 pieces of equipment.

During the biennium the following units have been completely overhauled at the Reno plant:

- 1....Caterpillar
- 9....Motor patrols
- 2....Snogos
- 10....All-Wheel-Drive trucks
- 19....Conventional drive trucks
- 19....Passenger cars
- 40....Pickups and station wagons
- 16....Waukesha motors
- 52....Ford and Chevrolet motors
- 2....Bulldozers
- 2....Wheeled tractors
- 6....Transmission and differentials
- 21....Sets of 36 Hargrave discs turned
- 17....Brooms rewound

The traveling service unit which was inaugurated during the 1938-1940 biennium has continued its very useful work of servicing and making minor repairs to the construction units in the field.

During the 1940-1942 biennium the following units were constructed at the Reno plant:

- 5....Blade snow plows
- 1....Ballast and sand tank for Sno King
- 1....Semitrailer and tank
- 2....Tanks mounted for transports
- 1....Oil transfer pump
- 1....Mechanical paint mixer for 55-gal. barrels of traffic line paint
- 6....Sanding machines for maintenance divisions

And the following units were reconstructed:

- 1....Compressor
- 1....Loader attachment for No. 99 A. W. Patrol
- 1....Motorization of pulvi-mixer

The Reno plant also maintains a night service that takes care of the servicing of the equipment in the Reno area, so each unit is ready to go out on the job each morning without delay that would be caused

if the units had to be gassed and oil and tires checked in the morning.

The parts department of the plant has furnished parts service to all the divisions and to the construction equipment in the field.

During the past biennium 263 pieces of equipment have been purchased, the majority of which were replacements and were purchased from local dealers in every county in the State.

Following is a listing of the equipment operated by the Department and serviced and repaired by the Reno Plant and the Division Shops—located in Las Vegas, Carson City, Ely, Elko, and Tonopah:

- 52....Passenger cars
- 56....Pickups
- 28....Station wagons
- 48....1½-ton trucks
- 30....2-3-ton trucks
- 61....4-5-ton trucks
- 13....Rotary snow plows
- 57....V type snow plows
- 85....Blade snow plows
- 7....Bulldozers
- 21....Motor patrols (14 Diesel and 7 gasoline)
- 6....Power shovels
- 8....Wheeled tractors
- 8....Crawler tractors
- 11....Kettles
- 11....Distributors
- 3....Car heaters
- 22....Graders and planers
- 9....Maintainers
- 5....Scarifiers and scrapers
- 1....Disc harrow
- 9....Rollers (4 powered and 5 pull)
- 9....Mowers
- 5....Concrete mixers
- 14....Trailers
- 5....Sweepers
- 4....Conveyors
- 3....Traffic markers
- 10....Miscellaneous equipment, such as, pulvi-mixers, compressors, gas hammers, material spreaders, loader attachments, and magnet trailer.

### DRIVERS LICENSE DIVISION

Prior to July 1, 1941, Nevada had a drivers license law which was inadequate in a great many respects. It provided that County Assessors should issue drivers licenses on the basis of a mere application. It was inadequate because it failed to test an applicant's driving ability and it failed to provide any central record-keeping system. Without a testing system it was possible for those with physical defects, which made them dangerous drivers, to secure a license. It was possible for an individual who knew nothing of the rules of the road, and

who could not operate a motor vehicle with any degree of proficiency, to obtain a license.

It has been the experience of this department that there were a few individuals with a visual acuity of  $20/400$  who were operating motor vehicles on the public highways. These individuals were denied licenses under the new Act, as they were dangerous drivers. They could only see at twenty feet what the average driver could see at four hundred feet. The lack of a central record-keeping system made it impossible to deny an individual the right to operate a motor vehicle. It has come to the attention of the department that one individual who had his driving privilege revoked by a court was able to secure licenses from four other counties who had no record of his having had a license revoked. The 1941 Legislature passed the Uniform Drivers' License Act, which was recommended by the U. S. Public Roads Administration. The Uniform Drivers' License Act has been in effect since July 1, 1941.

The law provided that after June 30, 1941, all operators' and chauffeurs' licenses issued under previous Acts were invalid. The law also provided that after July 1, 1941, it was unlawful to operate a motor vehicle on the public roads of this State without a valid license issued under the new Uniform Drivers' License Act. The law made it mandatory that the department issue, without examination, licenses to those individuals who had one year's driving experience, and who made application prior to October 1, 1941. The department designed its application blanks with the aim in view of detecting those individuals who had one year's driving experience, but whose driving records had been bad. These individuals, as far as possible, were singled out and given full examinations and proper restrictions imposed. The provisions of the law created a situation in which the department had to organize and license the big bulk of drivers between July 1, 1941, and October 1, 1941. The department licensed 51,092 applicants and gave 3,537 examinations to chauffeurs in this three-month period. In order to accomplish this licensing, offices were established at Reno, Lovelock, Winnemucca, Elko, Ely, Pioche, Las Vegas, Tonopah, Yerington, Fallon, and Carson City. In addition to the fixed offices, five traveling crews were sent into the smaller towns and areas.

The law provided that the department was required to issue licenses only in the county seats. The department felt that it was better to assume the expense of sending traveling crews into the smaller communities rather than to require the applicant to assume the expense, and travel to the county seat in order to comply with the law. As the volume of licenses decreased, traveling crews were dropped and local offices were closed. At the present time offices are maintained at the following highway offices: Carson City, Reno, Elko, Ely, and Tonopah. At Las Vegas the drivers license division office is maintained at the Sheriff's office due to a lack of space available at the division highway office. The remainder of the county seats are covered every two weeks by a traveling examiner or by highway employees who are traveling these routes on other highway business.

Due to Nevada's small and scattered population, it has been found that the operating expenses have been high in relation to the more populated States, such as New York and California.

From July 1, 1941, to June 30, 1942, 57,222 operators' licenses and 5,503 chauffeurs' licenses were issued, or a total license issuance of 62,725. Out of 62,725 licenses issued, 15,170, or 24%, of the applicants received full examinations.

Since it requires approximately one half an hour for an examiner to completely examine one applicant, the examining of these 15,170 applicants represents approximately 4 man-years of work.

A sample study of the 15,170 applicants who were tested shows some of the common driver faults which may be responsible for many accidents. See Table No. 31 in the Appendix.

The greatest number of errors noted were in backing a car 50 feet, in which 54% of the applicants were defective. The common faults being inability to back in a straight line, and failure to look at the roadway while backing. The second greatest fault noted was that 43% of the applicants had a driving posture so bad that it interfered with their ability to see, steer, and apply the foot brakes with ease. Another common fault of the average driver is to drive with his elbow out of the window, where, in the case of a side-swipe, which is one of the most common accidents, he would be severely injured. Stopping and parking a car on a grade accounted for deductions for 39% of the applicants. These deductions consist of failing to put on the hand brake, failure to leave the car in gear, and failure to park with the wheels blocked by the curb.

Emergency foot brake stops accounted for deductions for 35% of the applicants, the common faults being poor reaction time and failure to bring the car to a sudden stop. A common fault of 35% of the drivers was failure to come to a complete stop behind the cross walks when they approach a fixed stop sign.

In addition to the road test, a test is given in identifying road signs by their shape. It has been found that, of those passing the test, 72% of the applicants have achieved a score of 90% or better. This high percentage is accounted for by the fact that applicants, in the past, have been given an opportunity to refresh their memories prior to taking the test. This was done because, normally, people read signs rather than identify them by shape. The advantage of recognizing signs by shape is that this can be done at a greater distance, and in case the sign is snow-covered, or has been mutilated and rendered illegible, it can still be identified. This procedure was adopted as an educational function or driver improvement.

On the knowledge of road rules test, it was found that 14% of those who passed the test received a score of 70%; 27% obtained a score of 80%; 36% secured scores of 90%; and 23% made scores of 100%. It can be observed from these figures that the test is not difficult, yet 14% barely passed. See Table No. 32 of Appendix.

An analysis of driving test scores of those who passed the examinations shows that 19% of the applicants received grades from 70% to 79%, 48% scores of from 80% to 89%, and 33% scores of 90% to 100%. See Table No. 32 of Appendix.

It is to be observed that 52% of the applicants received road-test scores ranging from 80% to 94%, while at the same time their road-rules tests ranged from 80% to 90%. It can readily be seen there is a close relationship between a knowledge of road rules and actual driving ability.

It will be observed from the foregoing test statistics that the policy of the department has been one of leniency in granting licenses.

However, there are some individuals who fail to realize that the license to operate a motor vehicle is a privilege and not a right. These individuals have had their privileges revoked or suspended as a result of offenses committed. Revocations removed the driving privilege of 203 persons for a period of one year. Of these 203 revocations, 189 were for drunken driving and 6 for reckless driving, the remaining 8 being for various causes. See Table No. 33 in Appendix. All of these revocations, with two exceptions, were made only after a court conviction of a very serious offense which deserved severe treatment, or were mandatory under the law.

Suspensions were given to 25 individuals for various offenses. Eighteen of the 25 suspensions were for reckless driving, and two for making false affidavits. The remaining five suspensions were for various offenses which are listed in Table No. 34 in the Appendix.

We refer you to Table No. 35 in the Appendix for a list of revocations and suspensions by counties.

The law provides that the courts shall report all convictions of violations of the motor vehicle laws to the Drivers License Division, other than convictions concerning parking. It has been the experience of this department that most courts have given 100% cooperation in complying with this provision of the law.

A few courts, however, have been very lax in reporting these convictions to this department. The failure to comply with this section of the law has caused some injustice in the administration of the Act, and the effectiveness of a central record-keeping system of a driver's operating record has been impaired. The injustice arises from the fact that a driver will be convicted of an offense in one court and his driver's license suspended or revoked when the court reports the conviction, while another driver will be convicted of the same offense in another court, which will fail to report the conviction, with the result that the department fails to suspend or revoke the license because it has no knowledge of such conviction. The department, when advised of violations, has given 100% cooperation in backing up local officials with revocations, suspensions, and denials.

In summarizing the activities of this department it can be said that the policy has aimed to improve the driver. In order to obtain a driver's license the applicant must meet certain minimum standards. These minimum standards were established with leniency, and are being gradually made more difficult as the applicants become more familiar with what is expected of them. The department has endeavored to improve the driver by making available to him, in pamphlet form, the rules of the road and safe driving practices. Defects such as impaired vision are pointed out, and an effort is made to have the applicant consult an eye doctor. When the applicant makes a mistake on the road-rules test, the law is explained to him and he is shown how it is related to safe driving. When an error is made on the driving test the proper driving procedure is demonstrated. While some work has been done in the field of driver improvement, it is the desire of the department to do much more work along this line. Many drivers license divisions maintain what is known as a

driver improvement section. When a driver's record becomes bad he is called in and given a reexamination in detail, and an effort is made to determine what is the fault causing him to have accidents.

This phase of work offers one of the best opportunities to cut the high accident rate.

The policy of the department in regard to revocations and suspensions, however, has not been one of leniency. The period of revocation or suspension has been made uniform for all who commit the same offense.

In the short period of time, during which driver examinations have been required, the following record is presented to show the trend in fatal accidents. It is realized that this is only one of many departments and organizations which have devoted a great deal of time and effort toward safe driving and accident reduction.

Fatal accidents for the period October 1, 1941, to June 30, 1942, were 109% of the fatal accidents that occurred for similar period October 1, 1940, to June 30, 1941. For the period October 1, 1941, to June 30, 1942, traffic volume, as recorded on fixed counters throughout the State, was 148.5% of the traffic volume for the period October 1, 1940, to June 30, 1941. The rate of traffic accidents generally increases at a greater rate than the rate of increase in traffic volume, due to congestion.

It will be observed in this case that the rate of increase in fatalities was only 18.5% of the rate of increase in traffic volume. In other words, traffic fatalities show at least an 81.5% improvement in relation to traffic volume, since the Drivers License Division has been issuing licenses only on the results of examinations. See Table No. 6 in Appendix.

Respectfully submitted,

ROBERT A. ALLEN,

*State Highway Engineer.*



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## APPENDIX

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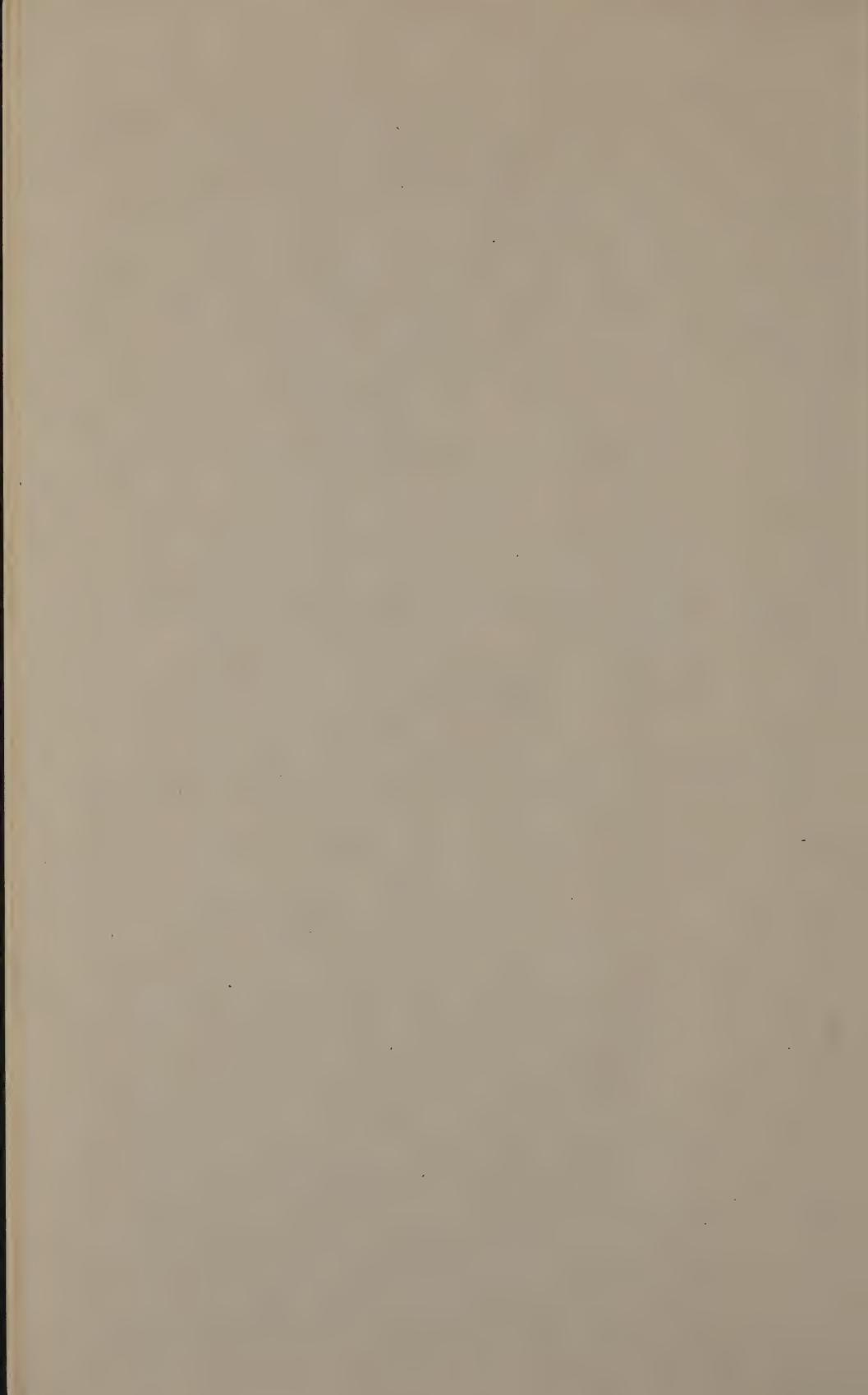
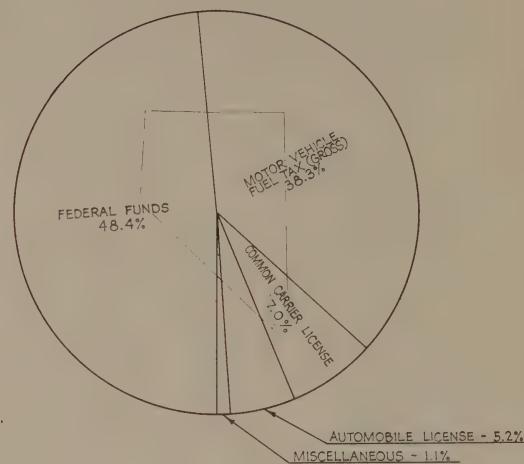


TABLE NO. 1  
STATEMENT OF RECEIPTS

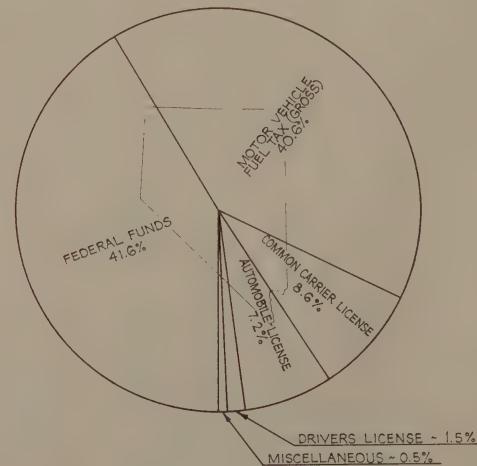
Classification	1917-1940	1941	1942	Total	Percentage
Legislative appropriation.....	\$40,000,000	.....	.....	\$40,000,000	.05
State tax levy.....	1,869,468.87	.....	.....	1,869,468.87	2.47
Auto license fees (net).....	2,488,514.08	\$227,553.06	\$39,542.73	2,056,509.87	4.03
Gasoline and use fuel tax.....	12,103,646.28	1,670,351.63	1,304,568.78	15,678,166.69	20.67
Common carrier license.....	1,633,626.32	306,011.90	404,449.16	2,341,087.38	3.09
Driver's license.....	.....	.....	67,614.00	67,614.00	.09
Certificate of title.....	4,509,805	.....	.....	4,509,805	.06
Racing commission fees.....	147,428.86	.....	.....	147,428.86	.20
Contractor's license.....	16,234.23	.....	.....	16,234.23	.02
Miscellaneous.....	821,003.57	36,822.91	25,247.93	886,042.77	1.17
State Highway bonds.....	1,900,000.00	2,115,580.43	1,951,591.21	4,993,562.99	2.51
Federal construction refunds.....	40,932,331.35	10,162.45	.....	41,117,286.75	5.43
County refunds on State maintenance.....	4,107,123.30	.....	.....	59,000.00	.08
County maintenance refunds.....	59,000.00	.....	.....	116,654.73	.15
Lincoln Highway Association construction refunds.....	116,654.73	.....	.....	71,426.60	.03
Utah-Nevada-California Association construction refunds.....	71,426.60	.....	.....	23,831.47	.03
San Francisco-Bay City construction refunds.....	23,831.47	.....	.....	57,000.00	.03
City construction refunds.....	25,000.00	.....	.....	212,553.41	.28
Railway crossing construction refunds.....	212,553.41	.....	.....	169,088.30	.22
	169,088.30	.....	.....		
	\$66,784,440.22	.....	\$4,367,082.38	\$4,693,013.87	100.00
				\$75,844,536.47	
*Advance to State by U. S. Government—Deposited to National Industrial Recovery Highway Fund— Trust Account.....	600,000.00	.....	.....	600,000.00	
Advance to State by U. S. Government—Deposited to Trust Account—Defense Highway Act of 1941.....	.....	.....	.....	600,000.00	
Totals.....	.....	.....	.....	\$77,044,536.47	

\*This advance repaid to U. S. Government.

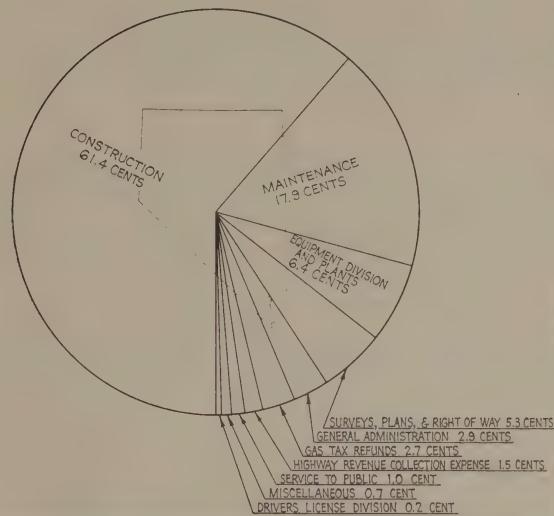
1941  
SOURCE OF INCOME  
AND  
PER CENT OF TOTAL



1942  
SOURCE OF INCOME  
AND  
PER CENT OF TOTAL



HOW YOUR HIGHWAY DOLLAR WAS SPENT  
FISCAL YEAR 1941



HOW YOUR HIGHWAY DOLLAR WAS SPENT  
FISCAL YEAR 1942

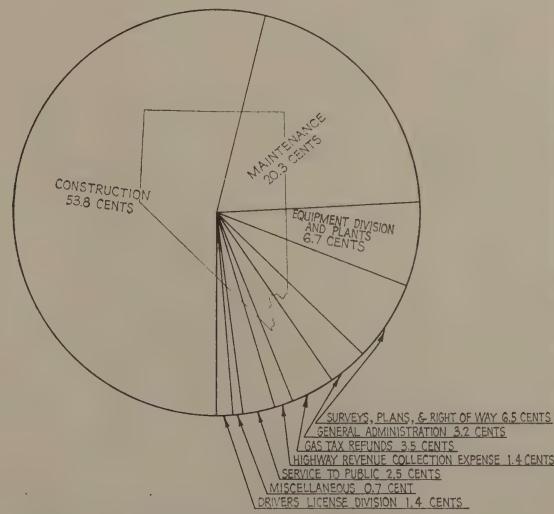


TABLE NO. 2  
STATEMENT OF DISBURSEMENTS

Classification	1917-1940	1941	1942	Total	Percentage
Highway construction	\$50,313,326.64	\$2,766,624.40	\$2,371,965.56	\$55,452,218.60	73.24
Surveys, plans, rights-of-way and preliminary engineering	2,669,377.93	234,576.06	284,996.12	3,189,010.11	4.21
Maintenance	9,638,341.22	774,575.50	818,789.57	10,661,701.29	14.08
County maintenance buildings	114,846.29			114,846.29	1.16
Equipment division and plants	9,949,939.11	288,423.60	291,341.32	1,582,701.03	2.09
Maintenance buildings		34,563.98	45,839.64	80,432.62	.11
Accounts receivable	736,153.39	25,716.86	25,086.79	787,357.04	1.04
Section 31 refunds	40,107.17			40,107.17	.05
County highway bond redemption	232,168.01			232,168.01	.31
Laboratory building	2,161,612.18			2,161,612.18	.24
General administration	1,594,694.24	131,467.79	139,814.75	1,865,376.78	2.16
Highway bulletin and publicity	49,613.18	9,490.37	8,144.50	10,313.43	.01
Road information		2,168.93			
Landscape-architect department	11,260.63	3,836.38		15,097.01	.02
Roadside improvement		1,423.51	2,817.80	4,241.31	.01
Special highway traffic count	56,225.12	7,414.55	8,024.24	69,635.91	.09
Safety division	26,802.38	8,600.81		35,163.22	.05
Traffic and sign department		7,020.26			
Sign division	15,175.01	16,861.80		13,574.25	.02
Pavement striping division			46,221.13	20,594.61	.03
Driver's license division			11,715.91	7,825.69	.01
Police patrol (highway)		8,507.89	62,074.55	41,745.91	.06
Common carrier license expense	308,926.05	32,697.55		341,623.60	.45
Public service commission inspectors	77,327.48	8,577.61		85,905.09	.11
Common carrier and truck refunds	19,743.61	14,758.70	52,354.81	67,132.51	.09
Gasoline tax refunds	415,287.37	5,101.15	11,135.51	20,691.30	.03
Use fuel tax administration	3,391.77	122,361.19	154,901.43	72,555.99	.96
Gasoline tax administration	17,067.00	4,035.68	34,131.33	10,840.58	.01
		4,691.88	7,671.35	29,433.23	.01
Transfer to Revolving Fund	\$66,739,757.78	\$4,508,973.58	\$4,411,860.39	\$75,710,409.75	100.00
Transfer to U. S. Treasurer from Trust Fund	52,452.02	30,000.00		52,152.02	
Totals	600,000.00			600,000.00	
	<b>\$67,412,027.80</b>	<b>\$4,538,973.58</b>	<b>\$4,411,860.39</b>	<b>\$76,362,861.77</b>	
Reconciliation:					
Total receipts					
Total disbursements					
State Highway balance—July 1, 1942 <sup>2</sup>					
Lists filed July 5 and 20, 1942, included in disbursements					
State Controller's balance—July 1, 1942 <sup>1</sup>					
State Highway balance (Highway Fund)*					
State Highway balance (Trust Account)					
State Controller's balance (Highway Fund)†					
State Controller's balance (Trust Account)					

\$910,220.64

\$338,420.81

\$343,253.39

\$342,639.60

\$76,362,861.77

\$681,674.70

\$367,521.04

\$42,639.60

\$910,220.64

TABLE NO. 3  
STATEMENT OF RECEIPTS AND DISBURSEMENTS FOR THE PERIOD  
JULY 1, 1940, TO JUNE 30, 1942

RECEIPTS	1941	1942	Total	Per- centage
Federal aid .....	\$2,115,580.43	\$1,951,591.21	\$4,067,171.64	44.89
County aid on construction.....	10,162.45	.....	10,162.45	.11
Other aid on construction.....	11,059.87	1,030.96	12,090.83	.13
Miscellaneous .....	25,763.04	24,217.03	49,980.07	.55
Gasoline and use fuel tax.....	1,670,551.63	1,904,568.78	3,575,120.41	39.46
Auto license (net) .....	227,953.06	339,542.73	567,495.79	6.27
Common carrier license.....	306,011.90	404,449.16	710,461.06	7.84
Driver's license .....	.....	67,614.00	67,614.00	.75
	\$4,367,082.38	\$4,693,013.87	\$9,060,096.25	100.00
Advance to State by U. S. Government Deposited "Trust Account-Defense Highway Act of 1941".....	.....	600,000.00	600,000.00	
	\$4,367,082.38	\$5,293,013.87	\$9,660,096.25	
DISBURSEMENTS				
General administration .....	\$131,467.79	\$139,814.75	\$271,282.54	3.04
Special traffic surveys.....	7,444.55	8,024.24	15,468.79	.17
Highways and Parks bulletin.....	4,151.38	.....	4,151.38	.05
Publicity and advertising.....	5,338.99	.....	5,338.99	.06
Road information .....	2,168.93	8,144.50	10,313.43	.11
Landscape and architect department .....	3,836.38	.....	3,836.38	.04
Roadside improvement .....	1,423.51	2,817.80	4,241.31	.05
Safety division .....	8,600.84	.....	8,600.84	.10
Traffic and sign department (Headquarters) .....	7,020.36	13,574.25	20,594.61	.23
Sign division .....	16,860.80	46,221.13	63,081.93	.71
Pavement striping .....	.....	41,715.91	41,715.91	.47
Driver's license division .....	8,507.89	62,074.55	70,582.44	.79
Police patrol (highway) .....	32,697.55	.....	32,697.55	.37
Common carrier license expense .....	8,577.61	.....	8,577.61	.10
Public service commission inspectors .....	14,758.70	52,354.81	67,113.51	.75
Common carrier license refunds .....	540.15	413.54	953.69	.01
Gasoline tax refunds.....	122,367.19	154,901.43	277,268.62	3.11
Use fuel tax administration.....	4,035.68	3,413.13	7,448.81	.08
Gasoline tax administration.....	4,694.88	7,671.35	12,366.23	.14
Maintenance .....	774,573.50	848,789.57	1,623,363.07	18.20
Surveys, plans, rights of way, etc. .....	234,576.06	284,696.12	519,272.18	5.82
Equipment division and plants .....	288,423.60	294,341.32	582,764.92	6.53
Maintenance buildings .....	34,563.98	45,839.64	80,403.62	.90
Highway construction .....	2,766,626.40	2,371,965.56	5,138,591.96	57.60
Accounts receivable .....	25,716.86	25,086.79	50,803.65	.57
	\$4,508,973.58	\$4,411,860.39	\$8,920,833.97	100.00
Transfer to Revolving Fund.....	30,000.00	.....	30,000.00	
Totals .....	\$4,538,973.58	\$4,411,860.39	\$8,950,833.97	

TABLE NO. 4  
FEDERAL AID ALLOTMENTS

1921 and prior .....	\$3,527,276.18
1922 .....	953,436.78
1923 .....	635,624.52
1924 .....	826,360.27
1925 .....	947,623.25
1926 .....	956,576.00
1927 .....	948,318.00
1928 .....	948,510.00
1929 .....	957,995.00
1930 Regular .....	960,375.00
1930 Public lands .....	588,914.00
1931 Regular .....	1,601,408.00
1931 Unused portion Hawaii allotment .....	4,288.00
1931 Advance .....	904,961.83
1932 Regular .....	1,598,987.00
1932 Public lands .....	440,683.00
1933 Regular .....	1,421,688.63
1933 Emergency .....	1,575,756.00
1934 National Recovery .....	5,675,875.00
1935 National Recovery .....	2,844,481.00
1936 Regular .....	1,595,501.00
1936 Public lands .....	553,135.00
1936 Works Program, highway .....	2,243,074.00
1936 Works Program, grade crossing elimination .....	887,260.00
1937 Regular .....	1,593,978.00
1938 Regular .....	1,632,335.00
1938 Secondary highways .....	326,477.00
1938 Grade crossing elimination .....	250,000.00
1938 Public lands .....	560,201.00
1939 Regular .....	1,590,172.00
1939 Secondary highways .....	318,034.00
1939 Grade crossings .....	243,750.00
1939 Public lands .....	559,895.00
1940 Regular .....	1,275,938.00
1940 Secondary highways .....	191,391.00
1940 Grade crossings .....	97,500.00
1940 Public lands .....	212,442.00
1940 Regular (reapportioned from other States) .....	6,718.00
1940 Secondary (reapportioned from other States) .....	690.00
1940 Grade crossing (reapportioned from other States) .....	781.00
1941 Regular .....	1,462,071.00
1941 Secondary highways .....	190,705.00
1941 Grade crossings .....	146,250.00
1941 Public lands .....	218,031.00
1941 Regular (reapportioned from Georgia) .....	4,919.00
1941 Secondary (reapportioned from Georgia) .....	738.00
1941 Grade crossing (reapportioned from Georgia) .....	358.00
1942 Regular .....	1,274,718.00
1942 Secondary .....	223,076.00
1942 Grade crossings .....	97,500.00
1942 Public lands .....	207,128.00
1943 Regular .....	1,275,386.00
1943 Secondary .....	223,193.00
1943 Grade crossing .....	97,500.00
1943 Strategic net .....	318,847.00
1943 Advance engineering .....	127,539.00

\$48,326,418.46

TABLE NO. 5  
STATEMENT OF COUNTY HIGHWAY BONDS

Principal and Interest Paid from State Highway Fund as Authorized  
by 1929 Statutes

Calendar year	Principal	Interest	Total
1929.....	\$17,000.00	\$4,521.65	\$21,521.65
1930.....	18,000.00	7,407.00	25,407.00
1931.....	25,500.00	8,356.80	33,856.80
1932.....	25,500.00	6,935.55	32,435.55
1933.....	25,500.00	5,514.30	31,014.30
1934.....	23,500.00	4,093.05	27,593.05
1935.....	11,500.00	2,771.80	14,271.80
1936.....	11,500.00	2,140.55	13,640.55
1937.....	7,500.00	1,509.30	9,009.30
1938.....	7,500.00	1,078.05	8,578.05
1939.....	7,500.00	373.62	7,873.62
1940.....	7,500.00	*533.66	6,966.34

\$188,000.00      \$44,168.01      \$232,168.01

\*Credit of \$533.66 on interest paid in 1940 is to offset interest payments to Lyon County.

## Counties in Which Bonds Were Paid

County	Bonds issued	Interest	Total
Churchill	\$53,000.00	\$11,280.00	\$64,280.00
Douglas	32,000.00	6,241.65	38,241.65
Eureka	28,000.00	3,950.00	31,950.00
Lyon	75,000.00	22,696.36	97,696.36
	\$188,000.00	\$44,168.01	\$232,168.01

TABLE NO. 6  
STATE HIGHWAY BONDS

## Principal and Interest Paid from Motor Vehicle License Fees

Year	Redemption of principal each year	Interest payments	License receipts	Balance receipts
1920	\$90,000.00	\$654.15	\$103,758.58	
1921	100,000.00	29,126.99	102,410.32	
1922	60,000.00	17,920.48	120,944.38	\$29,411.66
1923		42,680.00	153,888.10	111,228.10
1924		25,640.00	181,969.85	156,329.85
1925	50,000.00	32,589.40	209,231.02	126,661.62
1926	100,000.00	31,750.00	209,919.71	78,169.71
1927	100,000.00	30,097.22	229,839.32	99,742.10
1928	100,000.00	28,814.59	249,110.62	120,296.03
1929	150,000.00	23,972.22	296,530.03	122,557.81
1930	150,000.00	16,056.25	330,222.25	164,166.00
1931	150,000.00	14,487.50	333,131.49	168,643.99
1932	100,000.00	20,127.60	332,973.00	212,845.40
1933	150,000.00	25,250.00	299,617.00	124,367.00
1934	100,000.00	19,750.00	246,828.00	127,078.00
1935	50,000.00	16,500.00	263,511.00	197,011.00
1936	75,000.00	13,781.25	279,429.00	190,647.75
1937	75,000.00	12,125.00	294,592.00	207,467.00
1938	75,000.00	9,868.05	266,611.00	181,742.95
1939	75,000.00	8,875.00	285,709.00	201,834.00
1940	75,000.00	5,625.00	312,223.00	231,598.00
1941	75,000.00	2,625.00	350,036.00	272,411.00
Total bonds authorized			\$1,900,000.00	
Total bonds issued			1,900,000.00	
Total bonds redeemed			1,900,000.00	

TABLE NO. 7  
MAINTENANCE COSTS FROM 1918-1942

Mileage		Mileage	
1918	\$16,596.54	1930	1,905.43
1919	29,330.21	1931*	2,061.34
1920	44,323.34	1932	2,113.02
1921	33,601.26	1933	2,151.64
1922	61,997.55	1934	2,287.37
1923	442.98	1935	2,524.77
1924	765.23	1936	2,656.68
1925	903.90	1937	2,697.82
1926	1,213.43	1938	2,770.20
1927	1,445.08	1939	2,805.90
1928	1,680.73	1940	2,908.48
1929	1,875.16	1941	2,941.22
		1942	3,015.76

\*Seven months' expenditures, December 1, 1930, to June 30, 1931. Starting during the fiscal year 1933 and continuing through 1934, the maintenance crews worked and were paid for five days a week only.

TABLE NO. 8  
SNOW REMOVAL COSTS, \*1923-1942

1923	\$12,695.38	1932	\$83,632.96
1924	884.53	1933	83,497.61
1925	1,479.13	1934	8,227.13
1926	1,803.43	1935	28,573.76
1927	8,228.95	1936	50,948.37
1928	3,167.50	1937	131,066.03
1929	16,172.05	1938	59,468.88
1930	19,466.28	1939	71,681.97
1931	4,711.45	1940	42,403.61
		1941	57,008.71
		1942	87,357.42

\*Snow removal costs prior to 1923 not available.

During the State's fiscal year ended June 30, 1942, the Department of Highways expended for maintaining 3,015.76 miles of highway, the

sum of \$848,789.57. The total mileage includes improved and unimproved types of road, and the total cost includes all direct and indirect charges to maintenance.

TABLE NO. 9  
MAINTENANCE MILEAGE AND EXPENDITURES BY ROAD TYPE  
FISCAL YEAR 1941

Type of road or construction	Mileage	Expenditures
Retread .....	3.06	\$1,245.34
Cement concrete .....	14.74	11,009.35
Asphaltic concrete .....	44.19	28,810.65
Plantmixed bituminous-treated gravel .....	255.71	65,442.32
Roadmixed bituminous-treated gravel .....	2,391.99	514,845.68
Gravel .....	105.03	19,667.13
Graded and unimproved .....	126.50	16,103.76
Bridge maintenance .....	.....	5,120.75
Additions and betterments*	.....	112,328.52
	2,941.22	\$774,573.50
*Comprising the following items:		
Center stripe .....	.....	\$43,204.28
Reconditioning .....	.....	24,368.35
Seal coat .....	.....	37,322.63
Stock piling .....	.....	3,414.17
Replacing guard rail .....	.....	464.42
Raising and widening shoulders .....	.....	2,272.99
Fencing maintenance houses .....	.....	1,281.68
		\$112,328.52

MAINTENANCE COST PER MILE BY ROAD TYPE, FISCAL YEAR 1941

Type of surface	Mileage	Cost	Cost per mile
Retread .....	3.06	\$1,245.34	\$406.97
Cement concrete .....	14.74	11,009.35	746.90
Asphaltic concrete .....	44.19	28,810.65	651.97
Plantmixed bituminous-treated gravel .....	255.71	65,442.32	255.92
Roadmixed bituminous-treated gravel .....	2,391.99	514,845.68	2,152.37
Gravel .....	105.03	19,667.13	1,872.52
Graded and unimproved .....	126.50	16,103.76	1,273.02
	2,941.22	\$657,124.23	*\$223.41

\*Average cost per mile.

TABLE NO. 10  
EXPENDITURES FOR VARIOUS MAINTENANCE OPERATIONS ON CEMENT CONCRETE, ASPHALTIC CONCRETE, AND  
PLANTMIX BITUMINOUS-TREATED GRAVEL ROADS, FISCAL YEAR 1941

Operation	Percent	Asphaltic concrete	Percent	Plantmix
Building and repairing shoulders.	8.7	\$5,498.08	19.1	\$7,113.57
Filling expansion joints and cracks and patching surface.	31.5	2,286.05	7.7	11,293.46
Cleaning ditches and culverts.	16.3	1,845.25	6.3	5,477.98
Cutting weeds and brush.	4.2	3,720.20	12.8	9,590.79
Repairing signs and markers.	5.4	1,249.15	4.2	4,105.18
Removing slides and trimming slopes.	15.4	1,653.89	5.6	3,822.40
Repairing washouts.	5.5	460.60	1.4	560.13
Repairing snow.	1.6	836.93	2.8	2,031.67
Repairing guard rail.	.7	426.37	1.5	575.62
Ripraping and protecting slopes.	.7	24.55	.1	507.11
Removing debris and waste material along right of way.	.7	836.67	2.9	2,396.88
Removing culverts.	.....	22,000	.8	2,229.14
Reconditioning.	.....	7,414.46	3	1,227.84
Painting traffic center line.	.4	640.27	2.2	655.89
Erecting, removing, and repairing snow fence.	.....	973.55	3.2	317.20
Maintenance stations upkept.	1.1	123.45	.4	459.42
Repairing road approaches.	.....	1,156.13	4.0	5,502.61
Landscape maintenance.	2.6	3,885.60	13.1	13,599
Flattening slopes.	.7	194.80	.4	5,502.61
Scaling icy roads.	.....	.....	.....	8.4
Sealing coaling.	.....	.....	.....	1.0
Rental of garages, storage sheds, etc.	.....	115.78	.4	1,668.92
Administration.	1,044.21	9.5	2,758.78	9.6
				6,266.43
				9.6
				100.0
				\$28,810.65
				100.0
				\$65,442.32
				100.0
				\$11,009.35

TABLE NO. 11  
EXPENDITURES FOR VARIOUS MAINTENANCE OPERATIONS ON BITUMINOUS-TREATED, GRADED AND UNIMPROVED ROADS, FISCAL YEAR 1941

TABLE NO. 12  
EXPENDITURES FOR VARIOUS MAINTENANCE OPERATIONS ON  
BRIDGES, FISCAL YEAR 1941

Operation	Amount	Percent
Channel work	\$880.36	17.2
Substructure—General repairs	338.47	6.6
Substructure—Painting	392.90	7.7
Superstructure—General repairs	512.44	10.0
Superstructure—Painting	406.33	7.9
Repairs to bridge surface	78.78	1.5
Approaches—General repairs and surfacing	403.17	7.9
Approaches—Guard rail	173.54	3.4
Supplementary maintenance including lighting, pumping system, etc.	726.38	14.2
Inspection and administration	1,208.38	23.6
	\$5,120.75	100.0

TOTAL EXPENDITURES FOR MAINTENANCE AND BETTERMENT WORK IN EACH COUNTY, FISCAL YEAR 1941

County	Mileage	Expenditures
Churchill	170.52	\$35,825.94
Clark	308.52	97,524.96
Douglas	77.01	33,203.47
Elko	411.87	100,532.44
Esmeralda	208.40	43,560.10
Eureka	78.75	33,785.72
Humboldt	150.78	29,214.70
Lander	158.72	42,906.68
Lincoln	198.47	36,126.84
Lyon	157.63	42,226.50
Mineral	119.29	33,257.19
Nye	335.93	51,665.66
Ormsby	28.09	12,226.26
Pershing	86.31	16,581.54
Storey	9.55	5,946.58
Washoe	164.16	100,309.00
White Pine	277.22	59,679.92
	2,941.22	\$774,573.50

MAINTENANCE REPORT FOR THE FISCAL YEAR  
JULY 1, 1940, TO JUNE 30, 1941

During the State's fiscal year ending June 30, 1941, the Department of Highways spent \$774,573.50 for maintaining 2,941.22 miles of highway. The total mileage includes improved and unimproved types of road and the total cost includes all direct and indirect charges to maintenance.

TABLE NO. 13

MAINTENANCE MILEAGE AND EXPENDITURES BY ROAD TYPE  
FISCAL YEAR 1942

Type of road construction	Mileage	Expenditures
Cement concrete	13.33	\$12,761.67
Asphaltic concrete	44.19	24,353.77
Plantmixed bituminous-treated gravel	323.70	85,182.39
Roadmixed bituminous-treated gravel	2,365.45	538,520.69
Gravel	132.72	30,038.94
Graded and unimproved	136.00	29,898.65
Bridge maintenance		17,744.55
Additions and betterments*		110,288.91
	3,015.39	\$848,789.57
*Comprising the following items		
Seal coating	\$69,788.23	
Reconditioning	37,599.28	
Stock pile	2,801.81	
Miscellaneous	99.59	
		\$110,288.91

## MAINTENANCE COST PER MILE BY ROAD TYPE, FISCAL YEAR 1942

Type of surface	Mileage	Cost	Cost per mile
Cement concrete .....	13.33	\$12,761.67	\$957.36
Asphaltic concrete .....	44.19	21,353.77	551.92
Plantmixed bituminous-treated gravel .....	323.70	85,182.39	263.53
Roadmixed bituminous-treated gravel .....	2,365.45	538,520.69	227.90
Gravel .....	132.72	30,038.94	226.50
Graded and unimproved .....	136.00	29,898.65	219.80
	3,015.39	\$720,756.11	*\$239.50

\*Average cost per mile.

TABLE NO. 14  
EXPENDITURES FOR VARIOUS MAINTENANCE OPERATIONS ON CEMENT CONCRETE, ASPHALTIC CONCRETE, AND  
PLANTMIX BITUMINOUS-TREATED GRAVEL ROADS, FISCAL YEAR 1942

Operation	Cement concrete	Percent	Asphaltic concrete	Percent	Plantmix	Percent
Building and repairing shoulders.....	\$106,48	1.6	\$12,76	11.5	\$7,202,31	8.4
Filling expansion joints and cracks and patching surface.....	2,071,97	16.1	4,562,35	18.6	21,740,32	25.4
Cleaning ditches and culverts.....	3,036,90	23.7	1,941,51	7.3	5,722,57	6.7
Cutting weeds and brush.....	1,132,52	8.8	2,588,09	9.6	9,271,95	10.8
Repairing and cleaning ditches.....	1,37,87	.3	170,99	.7	1,352,70	1.6
Removing slides and trimming slopes.....	2,996,36	18.7	1,220,78	5.0	6,998,02	8.2
Repairing washouts.....	205,69	1.6	886,87	3.6	1,854,27	2.2
Hauling and spreading patching material.....	.....	.....	1,52,37	6	80,20	.1
Removing snow.....	919,37	7.2	2,255,89	9.6	6,371,90	7.5
Repairing guard rail.....	46,45	.4	200,88	.8	21,14	.2
Riprapping and protecting slopes.....	47,66	.4	.....	.....	2,293,12	.3
Removing debris and waste material along right of way.....	208,82	1.6	1,137,91	4.7	2,573,77	3.0
Repairing culverts.....	.....	.....	.....	.....	201,01	.2
Reconditioning.....	52,18	.4	353,34	1.4	*31,09	.....
Repairing fences and gates on right of way.....	.....	.....	.....	.....	614,75	.7
Painting traffic center line.....	2,160	.2	978,49	4.0	13,47	.01
Erecting, removing, and repairing snow fence.....	216,77	1.7	378,45	1.5	75,75	.1
Maintenance stations upkeep.....	105,08	.8	321,60	1.3	58,43	.7
Repairing road approaches.....	.....	.....	1,775,17	5.2	3,340,54	3.9
Landscape maintenance.....	434,39	3.4	981,04	4.0	4,603,43	5.4
Flattening slopes.....	.....	.....	.....	.....	11,66	.01
Sanding icy roads.....	.....	.....	.....	.....	1,633,43	1.9
Seal coating.....	.....	.....	.....	.....	76,94	.08
Rental of garages, storage sheds, etc.....	249,71	1.9	141,95	.6	483,81	.6
Maintenance wayside parks.....	210,36	1.6	4788	.2	2,128,19	2.5
Emergency patrolling—General maintenance.....	1,239,33	9.6	2,441,20	9.8	8,133,10	9.5
Administration.....	.....	.....	.....	.....	.....	.....
<b>\$12,836.41</b>	<b>100.0</b>		<b>\$21,532.52</b>	<b>100.0</b>	<b>\$85,511.99</b>	<b>100.0</b>

\*Credit.

TABLE NO. 15  
EXPENDITURES FOR VARIOUS MAINTENANCE OPERATIONS ON BITUMINOUS-TREATED, GRADED AND UNIMPROVED ROADS, FISCAL YEAR 1949

TABLE NO. 16  
EXPENDITURES FOR VARIOUS MAINTENANCE OPERATIONS ON  
BRIDGES, FISCAL YEAR 1942

Operation	Amount	Percent
Channel work	\$2,606.73	14.7
Substructure—General repairs	86.93	.5
Substructure—Painting	25.04	.1
Superstructure—General repairs	692.34	3.9
Superstructure—Painting	31.62	.2
Repairs to bridge surface	1,027.39	5.8
Approaches—General repairs and surfacing	1,646.74	9.3
Approaches—Guard rail	555.89	3.1
Supplementary, maintenance, including lighting, pumping system, etc.	792.54	4.5
Inspection	767.62	4.3
Emergency protection	9,511.71	53.6
	\$17,744.55	100.0

TABLE NO. 17  
TOTAL EXPENDITURES FOR MAINTENANCE AND BETTERMENT  
WORK IN EACH COUNTY, FISCAL YEAR 1941-1942

County	Mileage	Expenditures
Churchill	172.52	\$39,564.33
Clark	332.59	87,725.50
Douglas	77.03	50,377.42
Elko	408.29	134,700.06
Esmeralda	215.90	52,205.76
Eureka	78.51	28,134.49
Humboldt	150.79	25,794.56
Lander	157.15	37,816.51
Lincoln	206.78	48,792.03
Lyon	158.04	35,676.59
Mineral	142.29	37,263.75
Nye	349.98	73,804.88
Ormsby	27.97	12,512.91
Pershing	86.36	14,866.25
Storey	9.55	5,949.63
Washeoe	164.45	101,643.08
White Pine	277.19	61,961.82
	3,015.39	\$848,789.57

MAINTENANCE REPORT FOR THE FISCAL YEAR JULY 1, 1941,  
TO JUNE 30, 1942

The total mileage includes improved and unimproved types of road and the total cost includes all direct and indirect charges to maintenance.

TABLE NO. 18  
CONTRACTS AWARDED BY STATE JULY 1, 1940, TO JUNE 30, 1941

Contract No.	County	Length in miles	Type of construction	Termini
603	Pershing	19.061	Plantmix	1 mile west of Lee Center to Humboldt House
604	White Pine	5.87	Roadmix	Kimberly to Keystone and Ruth to Junction Kimberly Road
605	Churchill	4.98	Bituminous surface treatment	Fallon to 5 miles south
606	Eureka	3.47	Roadmix	Junction U S 50— $\frac{1}{2}$ mile south of Fallon to 3 miles southeast
607	Storey	8.37	Roadmix	1 mile west of Pinenax to 1 mile west of Elko County line
608	Lyon	5.384	Roadmix	Virginia City to approximately 5 miles northwest
609	Nye	5.241	Gravel	5 miles south of Fernley to Fernley
610	Churchill	20.741	Grading	2 miles east of Warm Springs to Sandy Summit
611	Clark	1.01	Roadmix	2 $\frac{1}{2}$ miles southwest of Junction LA to 3 $\frac{1}{2}$ miles southwest
612	Humboldt	1.054	Roadmix	Junction Route 1A—5 miles south of Fallon to 1 mile west
613	Pershing	6.770	Roadmix	4 miles west of Fallon to 1 mile west of railroad pass
614	Esmeralda	6.513	Roadmix	Brawley Girard Street and National Avenue in Winnemucca
615	Clark	10.234	Roadmix	1 mile west of Woosley to Lee Center
616	Humboldt	17.302	Select material surface	6 miles east of Millers to 4 miles west of Millers
617	Pershing	11.731	Roadside improvement	California State line to 3 miles south of Searchlight
618	Douglas	13.454	Plantmix	Near Winnemucca, east city limits to 1 $\frac{1}{2}$ miles east
619	Churchill	6.29	Plantmix	Mill City to 3 miles southwest Humboldt County line
620	Washoe	6.833	Plantmix	3 miles north of Carter's to Gardnerville
621	Nye	2.94	Plantmix	1 mile west of Hazen to 1 $\frac{1}{2}$ miles west of Leeterville
622	Clark	20.741	Roadmix	California State line to 1 mile east of Verdi
623	Elko	17.301	Roadmix	2 miles east of Warm Springs to Sandy Summit
624	Lyon	3.55	Plantmix	California State line to 3 miles south of Searchlight
625	Humboldt	5.221	Roadmix	Near Silver Zone to near cliffsides
626	Lyon	15.212	Plantmix	5 miles south of Fernley to Fernley
627	Elko	9.03	Plantmix	3 miles east Buttton Point to east foot Golconda Summit
		6.111	Plantmix	5 miles northeast Luning to 1 $\frac{1}{2}$ miles west of Wells
				Welcome to 1 mile west of Wells

CONTRACTS AWARDED BY STATE JULY 1, 1941, TO JUNE 30, 1942

628	Lincoln	6.31	Gravel	State Route 7 to Prince Mine
629	Nye	5.04	Gravel	Junction Route 8A to 1 $\frac{1}{2}$ miles west of Manhattan
630	Esmeralda	0.940	Roadmix	2.2 miles south to 1.3 miles south of Goldfield
631	Eureka	3.592	Roadmix	10 miles east of Dunphy to $\frac{1}{2}$ mile west of Primeaux
632	Elko	4.890	Gravel	Elko-Lamoine
633	Elko	5.93	Plantmix	Elko 6 miles east
634	Lander	10.71	Gravel	18 miles south of Battle Mountain to 30 miles north of Austin
635	Clark-Nye	4.460	Gravel	Nelson to 4 $\frac{1}{2}$ miles west
636	Mineral-Nye	18.530	Plantmix	4.5 miles northeast Luning to Brucite
637	Clark	12.480	Plantmix	1 $\frac{1}{2}$ Street Las Vegas to 1.6 miles southeast (Dual)
638	Mineral	14.42	Plantmix	Luning to 14.4 miles northeast Luning
639	Humboldt-Lander	9.442	Plantmix	2 $\frac{1}{2}$ miles west Humboldt-Lander County line to $\frac{3}{4}$ mile east Battle Mountain
640	Humboldt	11.77	Plantmix	1 mile west Stonehouse to 2 $\frac{1}{2}$ miles west Humboldt-Lander County line

TABLE NO. 19  
SHOWING PROGRESS STATUS OF THE FEDERAL AID HIGHWAY SYSTEM AS OF JUNE 30, 1942, THE CLOSE OF THE BIENNIAL  
AID SYSTEM, AND ENTIRE HIGHWAY SYSTEM

County	FEDERAL AID SYSTEM		REMAINING STATE HIGHWAY SYSTEM		Entire State Highway System	
	Completed	Unimproved	Completed	Unimproved	Completed	Unimproved
Churchill.....	125.72	125.72	51.52	54.89	106.41	177.24
Clark.....	215.81	.....	17.03	193.75	351.56	373.62
Douglas.....	59.99	.....	95.05	12.30	29.33	77.02
Elko.....	331.83	331.83	308.02	403.07	426.88	308.02
Esmeralda.....	97.22	.....	55.30	153.36	192.28	250.58
Eureka.....	712.83	712.83	224.00	239.48	78.31	302.31
Humboldt.....	135.23	135.23	17.93	217.65	235.58	153.16
Lander.....	105.71	105.71	49.06	145.90	194.96	154.77
Lincoln.....	79.01	79.01	119.45	120.65	240.10	198.46
Lyon.....	107.61	107.61	50.3	73.20	123.54	120.65
Mineral.....	109.1	109.1	33.18	53.75	157.95	73.20
Nye.....	133.45	133.45	200.84	382.53	583.43	142.29
Ormsby.....	20.66	20.66	7.32	2.40	9.72	33.29
Pershing.....	15.03	15.03	11.80	170.14	181.94	279.98
Storey.....	9.55	9.55	3.10	23.45	26.55	86.83
Washoe.....	96.76	96.76	99.84	272.65	372.49	123.45
White Pine.....	248.63	18.04	266.67	18.60	106.05	124.65
Totals.....	2,024.15	39.92	2,064.07	1,033.41	2,419.63	3,057.56
						2,459.61
						5,517.17

TABLE NO. 20  
STATUS OF MILEAGE ON DESIGNATED STATE HIGHWAY  
SYSTEM BY TYPES

Type	As of June 30, 1941	As of June 30, 1942
Unimproved .....	2,233.01	2,459.61
Graded and drained.....	54.78	46.60
Total unsurfaced .....	2,287.79	2,506.21
Crushed gravel or stone surface.....	218.60	146.69
Roadmix asphaltic surface.....	2,443.91	2,459.62
Emulsified asphalt retread .....	5.19	
Plantmix asphaltic surface .....	191.58	333.84
Asphaltic concrete .....	43.20	42.15
Portland cement concrete .....	9.16	7.27
Miscellaneous .....	3.98	21.39
Total surfaced .....	2,915.62	3,010.96
Grand total .....	5,203.41	5,517.17

TABLE NO. 21  
CONSTRUCTION AND RECONSTRUCTION COMPLETED AND UNDER  
CONSTRUCTION ON THE DESIGNATED STATE HIGHWAY SYS-  
TEM AT THE CLOSE OF THE BIENNIVM.

Type	Miles new construction completed during biennium	Miles reconstruction completed during biennium	Miles new highway under construction at close of biennium	Miles reconstruction not yet completed at close of biennium	Total
Gravel surface .....	15.801	.....	15.509	.....	31.310
Roadmix surface .....	55.164	36.211	.....	3.592	94.967
Plantmix surface .....	.....	87.953	39.788	32.890	160.631
Total .....	70.965	124.164	55.297	36.482	286.908

TABLE NO. 22  
REVISED DESCRIPTION OF FEDERAL AID ROUTES STATE OF NEVADA

F.A. Route No.	Termini	Total mileage
1....	From the California-Nevada State line near Verdi via Reno, Fernley, Lovelock, Winnemucca, Battle Mountain, Elko, and Wells, to the Nevada-Utah State line at Wendover, Utah, with a spur to Railroad Street in Carlin.....	417.964
2....	From a point on Federal Aid Route 1 approximately 1 mile east of Fernley via Hazen, Fallon, Austin, Eureka, Ely, and Pioche to Caliente.....	421.195
3....	From the Nevada-California State line near Purdy, California, via Reno, Carson City, Minden, Yerington, Hawthorne, and Tonopah to the south city limits of Goldfield with a spur connection from a point near Holbrook to the Nevada-California State line en route to Bridgeport.....	309.806
4....	From the Nevada-California State line near Bijou, California, to a point on Federal Aid Route 3 approximately 3 miles south of Carson City, and from another point on Federal Aid Route 3 at Carson City via Mound House and Dayton to a point on Federal Aid Route 2 near Leeteville.....	75.746
5....	From the Nevada-Arizona State line near Mesquite via Las Vegas to the Nevada-California State line southwest of Jean.....	128.006
6....	From a point on Federal Aid Route 1 in Winnemucca via Orovada to the Nevada-Oregon State line near McDermitt.....	73.925
7....	From a point on Federal Aid Route 2 at the east city limits of Ely via McGill to a point on Federal Aid Route 1 near Wendover, Utah.....	118.269
8....	From a point on Federal Aid Route 3 approximately 10 miles south of Reno via Virginia City to a point on Federal Aid Route 4 near Mound House.....	22.243
9....	From a point on Federal Aid Route 1 approximately 1 mile east of Wells via Contact to the Nevada-Idaho State line en route to Twin Falls, Idaho.....	67.734
10....	From a point on Federal Aid Route 7 approximately 4 miles south of the Elko-White Pine County line to a point on Federal Aid Route 1 approximately 1 mile east of Wells.....	78.887
11....	From a point on Federal Aid Route 5 in Las Vegas via Boulder City to Nevada-Arizona State line at Boulder Dam.....	31.176
12....	From a point on Federal Aid Route 3 near Rhodes via Basalt to the Nevada-California State line near Benton, California.....	34.171
13....	From a point on Federal Aid Route 12 near Basalt to a point on Federal Aid Route 3 near Coaldale.....	22.364
14....	From a point on Federal Aid Route 3 in Tonopah via Warm Springs and Currant Creek to a point on Federal Aid Route 2 in Ely.....	168.105
15....	From a point on Federal Aid Route 11 at Railroad Pass via Searchlight to the Nevada-California State line en route to Needles, California.....	56.389
16....	From a point on Federal Aid Route 2 at east Foot of Connor's Pass via Sacramento Pass to the Nevada-Utah State line en route to Delta, Utah .....	38.366
Total		2,064.077

## SUMMARY FEDERAL AID SYSTEM

Total Miles by Types as of June 30, 1942

Unimproved .....	39.92
Roadmix asphaltic surface .....	1,649.42
Plantmix asphaltic surface .....	311.68
Asphaltic concrete .....	38.45
Cement concrete .....	7.27
Miscellaneous .....	17.33
Total .....	2,064.07

TABLE NO. 23  
DAY LABOR CONSTRUCTION PROJECTS, JULY 1, 1940, TO JUNE 30, 1942

Construction authorization No.	Day labor No.	County	Mileage	Type of construction	Location
495 (a)	132	Mineral and Nye.	32.0	Grading and gravel surface.....	Luning to point opposite Brucite
541 (a)		Washoe.		Boiler room partition.....	Reno Plant
551 (a)		Washoe.		Heating unit.....	Reno Plant
570 (a)	179	Humboldt.	16.0	Grading and gravel surface.....	Golconda to Red House
571 (a)		Ormsby.		Storage garage.....	Carson City
572 (a)	180	Pershing.	0.7	Planimix surface.....	Lovelock
574	181	Lincoln.	1.2	Roadmix surface.....	Junction U S 93 to Panaca
575		Nye.		Storage shed.....	Tonopah
576	182	Churchill.		Construct deck.....	Bridges Nos. B241 and B242
576		Washoe.		Metal guard rail.....	Near Browns
577		White Pine.		Oil storage plant and fencing.....	East Ely
579	185	Eureka.		Maintenance station and house.....	Emigrant Pass
580	186	Humboldt.		Maintenance station house.....	Orovada.
581	187	Humboldt.		Maintenance station house.....	Willow Springs
582	188	Nye.		Maintenance station house.....	Wellington
583	189	Lyon.		Maintenance station house.....	Lower Gold Hill
584 (a)	190	Storey.		Oil surface treatment.....	Eastgate
585	191	Churchill.	0.8		North Fork
586	192	Elko.		Maintenance station water supply.....	Parsville to Mountain City
587	193	Elko.	2.3	Widen and surface roadbed.....	Junction State Route 27 and U S 395
588	194	Washoe.		Guard rail.....	Vicinity of Dayton
589	195	Lyon.		Improve roads.	
590		Washoe.		Electrical work.	Reno Plant
591		Washoe.		Yard drainage.	Reno Plant
593	197	White Pine.		Metal guard rail.....	Between Keystone and Ely
594 (a)		White Pine.		Maintenance station water supply.....	Elipah
595		Washoe.		Water, air and steam lines.....	Reno Plant
596		Washoe.		Construct loading ramp.....	Reno Plant
597		Washoe.		Construct right of way fence.....	Near Haefed
598 (a)		Esmeralda.		Construct maintenance station.....	Fish Lake Valley
599		Washoe.		Construct cleaning vat.	Reno Plant
600	198	Esmeralda.	6.0	Place gravel surface.	Fish Lake Valley feeder road
601	199	Douglas.			Topaz Junction
602		Mineral.		Construct new connection.	
603		Eureka.		Install 8" C. M. pipe and inlet.....	Near Beowawe Station
604	200	Lincoln.		Grading and gravel surface.....	Panaca to Utah-Nevada State line
605		Elko.		Construct approach to U S 40.....	Carlin
606		White Pine.		Equipment storage sheds.	East Ely
607	202	White Pine.		Construct cement rubbel wall.	Ely
608 (a)	203	Esmeralda.	10.0	Grading and culverts.	Silver Peak to Nivloc

609(a).....	204	Lyon.....	30.8	.....Grading and surface.....	.....Wellington to California-Nevada State line
610.....	205	Storey.....	0.9	.....Grading, curbs and gutters and bituminous surface.	.....Through Virginia City
611.....	206	Washoe.....	0.2	.....Grading, curbs and gutters and bituminous surface.	.....Connecting Wells Avenue in City of Reno to U S 395
612.....	207	Washoe.....	.....Boiler room partition.	.....Reno Plant	
613.....	207	Lander.....	.....Construct timber and concrete bridge.	.....Near Bridges	
614.....	208	Esmeralda.....	0.12.....Widen and raise grade.	.....2 miles north of Goldfield	
615.....	209	Washoe.....	.....Guard rail.	.....Mill Siding near Franktown	
616.....	Clark.....		.....Construct division shops.		
617.....	210	Clark.....	7.0	.....Survey and plans for access road.	.....Las Vegas
618.....	211	Clark.....	3.0	.....Survey and plans for access road.	.....Las Vegas
619.....		Nye.....	.....Maintenance station house and garage.	.....Las Vegas	
620.....		Nye.....	.....Maintenance station house.	.....Gunnery Schools to Target Range	
621.....		Elko.....	.....Construct sand and storage shed.	.....Sheep Mountains	
622.....		Elko.....	.....Construct two maintenance station houses and water and water supply.	.....Las Vegas	
623.....		Washoe.....	.....Construct paint and sign shop.	.....Sunrise Mountain	
624.....		Washoe.....	.....Right of way fence.	.....Sarcobatus	
625.....		Washoe.....	.....Construct two maintenance station houses and garage.	.....Contact	
626.....	213	Churchill.....	.....Install 42 C. M. pipe culvert.	.....Reno Plant	
627.....		Elko.....	.....Grade crossing signals.	.....Near Fallon	
628.....	215	Washoe.....	.....Concrete stump for scales.	.....In Elko	
629.....		Douglas.....	.....Living quarters, heating, lighting and storage tanks.	.....Reno	
630.....		Elko.....	.....FalseworK for overpass and underpass.	.....Spooner's Station	
631.....	216	Churchill.....	.....Roadmix bituminous surface.	.....Silver Zone and Cliftside	
632.....	217	White Pine.....	.....Concrete curb and gutters and roadmix bituminous surface.	.....Scheckler Lane near Fallon	
633.....	218	Lincoln.....	.....Grade crossing signals.	.....Ely	
634.....	219	Clark.....	.....Grade crossing signals.	.....3.0 miles north of Pioche	
635.....	220	Nye.....	.....Grading gravel surface and drainage.	.....Near Las Vegas	
636.....		Lander.....	.....Maintenance station house improvement.	.....1.5 miles west to Manhattan	
637.....	221	Washoe.....	.....Cattle guard.	.....Peterson Station	
638.....	222	Nye, Mineral and Churchill.....	.....Grading temporary road.	.....South Boundary Pyramid Indian Reservation	
640.....		Washoe.....	.....Wiring and fixtures, boiler room.	.....From U S 50 to Brucite	
641.....		Washoe.....	.....Wiring and fixtures, paint shop.	.....Reno Plant	
642.....	224	Washoe.....	.....Grade crossing signals.	.....Keystone Street Reno	
643.....		Ormsby.....	.....Storage building.	.....Carson City	
644.....	225	Esmeralda.....	.....Drainage ditch.	.....15 miles south of Goldfield	
645.....	226	Nye.....	.....Drainage ditch.	.....24 miles south of Goldfield	
646(a).....	227	Clark.....	4.46.....Roadmix bituminous surface.	.....Nelson to 4.46 miles west	

Table No. 23—Continued

Construction authorization No.	Day labor No.	County	Type of construction	Mileage	Location
647.....	228.....	White Pine.....	Grading and roadmix bituminous surface.....	0.20.....	7 miles south of ELY
648.....	229.....	Washoe.....	Roadmix bituminous surface.....	4.00.....	North of Sparks
649.....	230.....	Washoe.....	Roadmix bituminous surface.....	6.50.....	Fallon to 6.5 miles south
650.....	.....	White Pine.....	2 additional rooms for maintenance station house.....	.....	Schellbourne

TABLE NO. 24  
DAY LABOR ROADSIDE IMPROVEMENT PROJECTS, JULY 1, 1940, TO JUNE 30, 1942

Construction authorization No.	Day labor No.	County	Mileage	Type of construction	Location
572 (a)	180	Pershing		Tree planting, curbs and gutters	Lovelock
578	184	Pershing		Comprehensive landscape treatment	3 miles west to Lovelock
592	196	Washoe		Comprehensive landscape treatment	California-Nevada State line to 1.0 miles west of Reno
639	223	Elko		Parking area	Adobe Summit

TABLE NO. 25

County	TOTAL MILEAGE OF SURVEYS—		FEEDER ROADS—	
	June 30, 1940	July 1, 1938, to	June 30, 1942	July 1, 1940, to
Churchill	20.17	26.47	5.07	
Clark	85.92	70.01	9.23	10.07
Douglas	21.13			
Elko	60.09	78.96	-----	39.96
Esmeralda	29.76	15.76		
Eureka	29.55	13.99		
Humboldt	15.81	26.77	3.00	
Landier	62.04	28.38		
Lincoln	10.00	15.88	3.50	6.31
Lyon	47.42	8.26		
Mineral	5.00	24.89		
Nye	29.51	39.75	6.59	3.75
Ormsby	6.42	1.30	2.00	
Pershing	39.56	-----	3.00	
Storey	6.41			
Washeoe	17.45	91.79	13.32	4.07
White Pine	26.53	32.88		
Totals	*512.77	*475.09	45.71	64.16
Cost per mile of surveys, July 1, 1938, to June 30, 1940....			\$208.25	
Cost per mile of surveys, July 1, 1940, to June 30, 1942....			308.95	

\*Total mileage includes feeder road surveys.

TABLE NO. 26  
PLANS COMPLETED, JULY 1, 1940, TO JUNE 30, 1942

Total cost, plans and estimates roadway and bridges...

\*Other projects consist of one lighting installation, one roadside improvement project, and two automatic grade crossing warning signal installations.

TABLE NO. 27  
TOTAL ACRES OF LAND ACQUIRED FOR HIGHWAY RIGHT OF WAY  
TO JUNE 30, 1942

Route	ACRES		Total private and Government	Total cost through private land	COST PER ACRE	
	Private	Government			Private	All land
1.....	6,406.96	8,695.70	15,102.66	\$105,412.04	\$16.45	\$6.98
1.....	111.99	1,309.91	1,421.90	100.00		
1B.....	744.71	554.71	1,299.42	2,949.70	3.96	2.27
2.....	843.23	11,649.30	12,492.53	25,978.88	30.81	2.08
2A.....	525.09	1,704.95	2,230.04	4,415.54		
2B.....	128.46	442.36	570.82	380.00		
3.....	1,390.32	5,918.92	7,309.24	69,349.72	49.88	9.49
3A.....	89.69	1,095.24	1,184.93			
4.....	240.67	7,299.44	7,540.11	156.00		
5.....	3,381.55	10,646.60	14,028.15	26,905.69	7.96	1.92
6.....	365.79	5,694.92	6,060.71	9,145.43	25.00	1.51
7.....	654.83	10,014.54	10,669.37	5,167.69		
8.....	277.21	2,913.02	3,190.23	1,305.03	4.71	.41
8A.....	172.36	4,225.21	4,397.57	1,836.99		
8B.....	88.23	531.34	619.57			
9.....	141.35	144.82	286.17	7,845.20		
10.....	11.29	541.30	552.59	100.00		
11.....	144.95	477.02	621.97	786.64		
11A.....	11.92	-----	11.92			
12.....	79.11	189.36	268.47			
13.....	398.83	5,572.57	5,971.40	1,077.27		
14.....	36.44	881.24	917.68	255.42		
15.....	7.20	1,051.28	1,058.48			
17.....	225.44	414.61	640.05	7,926.00		
19.....	23.14	9.83	32.97			
21.....	52.66	-----	52.66	116.00		
21B.....	15.67	-----	15.67			
23.....	19.38	1,555.85	1,575.23			
24.....	4.79	6,107.08	6,111.87			
26.....	-----	133.15	133.15			
27.....	30.47	-----	30.47	950.00		
29.....	-----	802.51	802.51			
32.....	17.60	-----	17.60			
33.....	270.82	370.64	641.46	212.90		
36.....	12.23	-----	12.23			
37.....	76.60	-----	76.60	1,367.00		
38.....	43.50	301.66	345.16	820.00		
43.....	407.18	602.03	1,009.21	940.00		
44.....	81.66	120.90	202.56			
46.....	62.91	93.71	156.62	140.00	2.23	.89
47.....	.50	971.40	971.90			
48.....	14.34	-----	14.34			
53.....	6.94	322.37	329.31			
58.....	-----	597.05	597.05			
59.....	11.92	-----	11.92			
60.....	-----	544.47	544.47			
61.....	12.79	-----	12.79			
62.....	15.21	-----	15.21			
67.....	.67	-----	.67			
69.....	-----	244.17	244.17			
Feeder.....	39.89	259.28	299.17			
Total.....	17,698.49	95,004.46	112,702.95	\$272,639.14	\$15.40	\$2.42

TABLE NO. 28  
 13TH BIENNIAL REPORT OF RIGHT OF WAY, JULY 1, 1940,  
 TO JUNE 30, 1942

Route	ACRES		Total private and Government	Total cost through private land	COST PER ACRE	
	Private	Government			Private	All land
1.....	1,915.06	1,969.45	3,884.51	\$20,600.22	\$10.76	\$5.30
1B.....	67.31	63.45	130.76	440.00	6.54	3.36
2.....	188.00	70.46	258.46	1,715.30	9.12	6.64
3.....	72.82	91.82	164.64	1,442.00	19.80	8.76
4.....	5.64	1,005.62	1,011.26			
5.....	122.48	893.79	1,016.27	21,763.75	177.69	21.42
6.....	.77	-----	.77	3,190.10	4,142.99	4,142.99
7.....	3.63	-----	3.63			
8.....	28.19	-----	28.19	80.00	2.84	2.84
8A.....	46.80	550.63	597.43			
17.....	16.99	-----	16.99			
23.....	19.38	1,555.85	1,575.23			
44.....	81.66	120.90	202.56			
46.....	58.72	93.71	152.43	140.00	2.38	.92
60.....	-----	544.47	544.47			
61.....	12.79	-----	12.79			
62.....	1.23	-----	1.23			
67.....	.67	-----	.67			
69.....	-----	244.17	244.17			
Feeder.....	39.89	259.28	299.17			
Total.....	2,682.03	7,463.60	10,145.63	\$49,371.37	\$18.41	\$4.87

TABLE NO. 29  
 MAINTENANCE SITES ACQUIRED, JULY 1, 1940, TO JUNE 30, 1942

County	Location	Acres	Cost
Washoe.....	Bowers Mansion.....	1.89	\$250.00
Ormsby.....	Carson City.....	.58	
Lyon.....	Wellington.....	.92	
Esmeralda.....	Near Dyer.....	1.00	
Totals.....	.....	4.39	\$250.00

TABLE NO. 30  
COMPARISON OF AVERAGE DAILY TRAFFIC AT AUTOMATIC RECORDERS FOR FOUR FISCAL YEAR PERIODS

Station	Location	DAILY AVERAGE			
		1938-1939	1939-1940	1940-1941	1941-1942
101	U S 40, East of Sparks	1,427	1,110	1,451	1,523
102 A	U S 91, South of Las Vegas	1,038	1,158	2,471	
103	State Route 46, South of Elko	280	280	268	223
104	U S 395, North of Carson			1,557	1,342
106	State Route 59, South of Lovelock	208		189	186
107	U S 40, East of Elko	745	856	870	844
108	U S 50, North of McGill	361	412	469	539
109	U S 95, South of East Ely	384	434	503	438
110	U S 93, Southeast of Las Vegas	1,481	1,699	1,979	4,898
112	U S 6, West of Tonopah	394	395	410	469
114	U S 95, Northwest of Las Vegas			247	255
115	U S 40 and 50 at Wendover				320
116	U S 40, West of Verdi				783
					1,422
Totals		6,690	7,748	12,458	12,987
Percentage increase		+12.1 <sup>a</sup>	+11.4 <sup>a</sup>	+30.4 <sup>b</sup>	+30.4 <sup>b</sup>

<sup>a</sup>Excludes Recorders 104, 114, 115, and 116.

<sup>b</sup>Excludes Recorders 104, 115, and 116.

• Excludes Recorder 102.

TABLE NO. 31  
DRIVING TEST DEDUCTIONS

Maneuver	Percentage with deductions	Maneuver	Percentage with deductions
Start	19.0	Turning about	17.0
Approach to corner	16.0	Parking	7.0
Slow sign	9.0	Stop on grade	39.0
Stop sign	35.0	Starting on grade	13.0
Traffic signal	8.0	Shifting going down hill	9.0
Left Turns—		Posture	43.0
Signals	14.0	Clutch	16.0
Speed	3.0	Attention	7.0
Lane	33.0	Keeping in lane	13.0
Turn	27.0	Following	1.0
Right Turns—		Overtaking	
Signals	17.0	Being overtaken	
Speed	3.0	Use of horn	3.0
Lane	14.0	Reaction time	1.0
Turn	19.0		
Quick stop	35.0		
Backing 50 feet	54.0		
Hand-brake stop	15.0		

## SIGN TEST SCORES

## First Test

Score ranges	Percent
70- 74	5
75- 79	2
80- 84	20
85- 89	1
90- 94	29
95-100	43
	100

Thumb prints given	96.3%
Restrictions on Licenses	10.0%
(a) Glasses	8.0%
(b) Other	2.0%

TABLE NO. 32  
CORRELATION TABLE OF ROAD RULES TESTS TO DRIVING  
ABILITY TESTS

Driving Ability Test Scores							
Road rules test scores	70-74	75-79	80-84	85-89	90-94	95-100	Total
70	4%	3%	3%	1%	3%	0%	14%
80	1%	2%	8%	7%	9%	0%	27%
90	3%	3%	11%	8%	9%	2%	36%
100	0%	3%	5%	5%	7%	3%	23%
Total	8%	11%	27%	21%	28%	5%	100%

## TABLE NO. 33

REVOCATIONS OF DRIVING PRIVILEGES BY THE NEVADA STATE  
HIGHWAY DEPARTMENT, DRIVERS LICENSE DIVISION

By Cause for the Period July 1, 1941, to June 30, 1942

	Number of cases
Drunken driving	189
Driving without a license	1
Reckless driving	6
Drunkenness	1
False affidavit	1
Accident	1
Defective eyes	1
Hit and run accident	1
Narcotic drugs	1
Grand theft	1
Total	203

TABLE NO. 34  
**SUSPENSIONS OF DRIVING PRIVILEGES BY THE NEVADA STATE HIGHWAY DEPARTMENT, DRIVERS LICENSE DIVISION**  
 By Cause for the Period July 1, 1941, to June 30, 1942

	Number of cases
Reckless driving .....	18
Drunk in a car.....	1
Accident .....	1
Driving without a license.....	1
Speeding .....	1
Parking without lights.....	1
False affidavit .....	2
Total .....	<u>25</u>

TABLE NO. 35  
**REVCOCATIONS AND SUSPENSIONS OF DRIVING PRIVILEGES BY THE NEVADA STATE HIGHWAY DEPARTMENT, DRIVERS LICENSE DIVISION.**

By Counties, July 1, 1941, to June 30, 1942

Counties	Revocations	Suspensions	Total
Churchill .....	7	...	7
Clark .....	25	2	27
Douglas .....	2	2	4
Elko .....	7	1	8
Esmeralda .....	9	...	9
Eureka .....	1	1	2
Humboldt .....	4	...	4
Lander .....	2	...	2
Lincoln .....	6	1	7
Lyon .....	14	...	14
Mineral .....	4	1	5
Nye .....	3	1	4
Ormsby .....	3	1	4
Pershing .....	3	2	5
Storey .....	...	...	...
Washoe .....	64	2	66
White Pine .....	24	7	31
Out of State .....	25	4	29
Total .....	<u>203</u>	<u>25</u>	<u>228</u>

TABLE RL-1  
 STATE OF NEVADA—DEPARTMENT OF HIGHWAYS  
 PLANNING DIVISION  
 PUBLIC ROADS ADMINISTRATION  
 State Highway Mileage by Type of Roadway and System 1941

Type	Primary State	SYSTEM		Secondary State	Totals
		Potential	Federal aid		
Primitive.....	.....	.....	.....	.....	540,618
Unimproved.....	39,919	31,940	353,499	1,178,772	1,604,130
Graded and drained.....	.....	21,960	27,236	79,699	128,835
Gravel or stone.....	.....	57,567	134,504	99,916	291,987
Bituminous surface treated.....	2,363	339,613	7,765	.....	10,118
Mixed bituminous.....	1,937,139	.....	268,158	188,784	2,733,694
Bituminous penetration.....	32,474	.....	4,630	1,361	38,465
Bituminous concrete.....	38,145	.....	1,700	2,953	42,802
Portland cement concrete.....	37,959	0.067	.....	0.067	8,093
Dual.....	3,932	.....	0.282	0.061	4,275
Combination.....	2,142	.....	.....	.....	.....
Totals.....	2,064,077	451,087	797,764	2,092,231	5,405,159

TABLE MV-1  
STATE OF NEVADA—DEPARTMENT OF HIGHWAYS  
PLANNING DIVISION  
PUBLIC ROADS ADMINISTRATION  
Comparison of Motor Vehicle Imposts Monthly and Cumulative for the Fiscal Years 1940-1941 and 1941-1942

REGISTRATION 1940-1941	REGISTRATION 1941-1942		MOTOR VEHICLE IMPOST RECEIPTS <sup>1</sup>		MOTOR VEHICLE IMPOST RECEIPTS <sup>1</sup>		MOTOR VEHICLE IMPOST RECEIPTS <sup>1</sup>		MOTOR VEHICLE IMPOST RECEIPTS <sup>1</sup>	
	1940-1941	1941-1942	CARRIER 1940-1941	CARRIER 1941-1942	FUEL <sup>1</sup> 1940-1941	FUEL <sup>1</sup> 1941-1942	TOTALS 1940-1941	TOTALS 1941-1942	CUMULATIVE 1940-1941	CUMULATIVE 1941-1942
July.....	\$11,427	\$19,709	172.5	\$12,258	\$16,184	132.0	\$164,091	\$193,150	117.7	\$187,776
August.....	9,075	8,192	8,216	10,058	17,079	195,414	188,070	213,664	\$229,043	122.0
September.....	20,502	27,901	136.1	20,474	26,242	128.2	334,870	388,564	116.0	375,846
October.....	6,549	10,968	5,439	8,665	150,072	168,775	162,060	162,060	117.8	442,707
November.....	27,051	38,863	143.7	25,913	34,907	134.7	484,942	557,339	114.9	532,906
December.....	7,119	7,003	10,517	8,097	135,377	157,032	153,615	153,615	117.3	631,115
January.....	34,770	45,872	131.9	36,430	43,004	118.0	620,319	714,371	115.2	712,132
February.....	5,477	4,970	1,892	4,087	47,097	122.9	115,967	135,751	115.2	803,247
March.....	40,247	50,842	126.3	38,232	47,097	122.9	736,286	850,122	115.5	1,233,336
April.....	3,017	2,738	2,557	4,612	40,879	107,460	131,377	107,460	113,034	948,055
May.....	43,264	53,580	123.8	40,879	51,703	126.5	843,746	981,499	116.3	138,727
June.....	77,281	85,843	85,843	60,652	107,739	90,801	101,086	92,789	116.3	1,086,782
Totals.....	120,545	139,923	115.7	101,551	159,442	157.0	934,547	1,082,585	115.8	1,294,688
July.....	88,111	69,775	133,513	144,067	90,321	106,638	1,056,653	1,156,653	115.8	1,381,470
August.....	208,656	209,198	100.3	236,154	303,509	129.1	1,024,868	1,189,233	116.0	1,468,676
September.....	70,127	94,725	29,717	29,323	110,915	128,448	1,210,759	1,210,759	116.0	2,522,496
October.....	278,783	303,923	109.0	332,832	125.7	1,135,783	1,317,331	116.0	1,679,437	116.4
November.....	24,091	35,918	17,896	40,574	125,596	128,985	1,167,583	1,167,583	117.8	1,954,506
December.....	302,874	339,841	112.2	282,767	373,406	132.1	1,261,379	1,446,716	114.7	1,847,020
January.....	15,316	227,198	27,659	21,373	21,373	1,167,771	1,167,771	116.0	2,132,362	115.4
February.....	318,190	367,339	115.4	290,316	394,779	135.9	1,408,150	1,587,214	112.7	1,169,716
March.....	13,459	12,336	15,615	9,670	162,151	130,397	201,6736	232,1731	115.1	189,369
Totals.....	\$331,649	\$379,675	114.5	\$306,011	\$404,449	132.2	\$1,370,301	\$1,717,611	109.4	\$2,480,921
										112.4

<sup>1</sup>Excludes refunds.

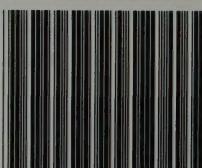




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